IJPS

INTERNATIONAL JOURNAL OF PRODUCTIVITY SCIENCE

VOLUME 3 ISSUE 1
JANUARY 2024

WORLD CONFEDERATION OF PRODUCTIVITY SCIENCE

WORLD ACADEMY OF PRODUCTIVITY SCIENCE

CONTENTS

EDITORIAL BOARD

CHIEF EDITOR

EDITORS

MEMBERS, EDITORIAL BOARD

ABOUT US

World Confederation of Productivity Science (WCPS) was founded in 1969 as an apex professional body for promotion and development of Productivity Science across the Globe.WCPS brings together individuals and organisations who share common aims and objectives of Social, Economic and Environment (SEE) Productivity. WCPS regularly organizes World Productivity Congress (WPC) in member countries to deliberate on Topical Productivity Challenges. WCPS also organizes relatively smaller customized Regional Conferences and Seminars for the benefit of Regional participation.

WCPS has two Divisions, World Academy of Productivity Science (WAPS) and World Network of Productivity Organizations (WNPO).

World Academy of Productivity Science is the Academic Division of WCPS engaged in Research, Education, Capacity Building and Knowledge Management. WAPS honors Experts, Academicians, Researchers and Productivity Professionals by inducting them as Fellows of WAPS.

World Network of Productivity Organizations is the Network of Organizations across the Globe engaged in promotion and development of Productivity Science. WNPO organizes events and Training programs with support of member organizations.

Message from President WAPS - Together, We Can Do Better

The Whole Is Greater Than The Sum of Its Parts

While the world is heavily dependent on international trade involving transactions made between countries, any geopolitical conflict poses direct impacts in the respective region and may even extend to a worldwide scale.

The war in Eastern Europe since 2022 and the Red Sea crisis, started in October 2023, presented not only violence in the respective regions but food and energy crisis in other parts of the world. No single country is spared.

The time and resources diverted by countries to deal with food, energy, and disease crisis means the same is taken from attention in restoring the environment and in economic development.

World Academy of Productivity Science has the mission of promoting productivity development to achieve world peace and prosperity.

Though we may not be able to stop geopolitical tensions and conflicts directly, we can help bring better life to people and build a better planet by promoting and stimulating productivity development.

The world can be a better place if Fellows of WAPS and productivity professionals in all countries and regions work together to find solutions to environmental issues, fight climate crisis and retore our planet; create new technology and harness the power of technology to enhance and endure productivity while giving people more time at their disposal; expand knowledge in formal, non-formal and informal education to develop well-rounded human beings to build an adequate and sustainable world. These are what we - Fellows of WAPS - and productivity professionals can do.

We are getting there:
Inaugurated in 2022, this is the third issue of our International Journal of Productivity Science.

We just completed the 6th Knowledge-Sharing Forum event in March.

We are getting great support from the WAPS Advisory Council which currently has four members: Mr. Graham Hasting-Evans of the United Kingdom, Professor Pritam Babu Sharma of India, Professor Michael Shepherd of Canada, and Dr. Thomas Tuttle of the United States.

We have called our first Fellows' Brainstorming Session at the end of January to determine how WAPS can do more to build our Fellows' community. A number of Fellows are taking more active roles to work with the WAPS executive team to lead different initiatives. We will be delighted to hear from you and work with you. Reach out to our team!

We are assembling photographs submitted to our Fellow Induction Photo Drive and they will be uploaded to our website shortly.

As always, please stay in touch - the executive team and I look forward to hearing from you and meeting you in person soon.

Sincerely yours,
Chen Shengchang
President, WAPS

Research on The Development Trend and Influencing Factors of Digital Transformation on Global Digital Productivity

Ren Yuheng and Wu Hong

Abstract

Digital economy is an important trend in the development of the world economy today. It is based on digital technology and promotes economic growth and development by means of digitization and information. Digital transformation is the key factor to promote the rapid development of digital economy, which means that enterprises or organizations transform traditional business into digital business and use digital technology to enhance their competitiveness. In the context of digital economy, digital transformation has become the only way for enterprises to develop. Only through digital transformation can enterprises better adapt to market demand, improve production efficiency, reduce costs and enhance competitiveness. Digital productivity is the application of digital technology to transform data into productivity, so as to promote economic development and social progress. The improvement of digital productivity will lead to more efficient, accurate and intelligent production methods and business models, thus promoting industrial upgrading and social transformation. There is a close relationship between digital transformation and digital productivity, with digital transformation being an important means to improve digital productivity, while digital productivity is an important manifestation of digital transformation.

Among the digital economy, digital transformation and digital productivity, digital productivity is an important driving force for the development of digital economy and the promotion of digital transformation. Its difference from traditional productivity lies in its integration with digital technology, which is an important means to realize the development of digital economy, including big data, cloud computing, artificial intelligence, Internet of things and other emerging technologies. These technologies can transform all kinds of information in the real world into digital information, which is convenient for data processing and utilization. The integration of digital technology and traditional productivity not only improves the quality and accuracy of data, but also reduces the cost and improves the efficiency, and drives the change of production factors and production relations, bringing new business models.

Therefore, the four elements of digital economy, digital transformation, digital productivity and digital technology are mutually reinforcing and supporting each other, and jointly driving the development and progress of today's world economy.

This paper systematically reviews the development trend and influencing factors of digital transformation on global digital productivity. However, the current theoretical research on global digital productivity is still superficial, and further research and discussion are expected.

1.1 Research Background

The theoretical research on global digital productivity aims to explore the impact of digital technology on global economic productivity. With the rapid development of digital technology, various industries around the world are facing the challenges and opportunities of digital transformation. The wide application of digital technology has greatly changed the pattern of global productivity, promoted the improvement of production efficiency and rapid economic growth.

At present, all countries in the world are implementing the relevant policies of digital economy, hoping to improve economic efficiency and competitiveness through digital transformation. Many countries, including the United States, Germany, Japan and China, have formulated digital economy development strategies and increased investment in the

research, development and application of digital technologies. The rapid development of digital economy on a global scale has had a positive impact on promoting global economic growth and improving productivity.

Scholars around the world are focusing on the impact of digital technology and digital productivity on economic development, but after analyzing the corresponding literature, it is found that there are still some problems and deficiencies in the existing research results. The first problem is that the specific impact mechanism of digital technology on productivity is not clear enough. Although many studies have paid attention to this aspect, there is still a lack of in-depth discussion and research on this impact mechanism. The second issue is that digital transformation will affect different industries and regions to different degrees, so more specific and precise research is needed for different situations. The third problem is that existing research mainly focuses on empirical analysis and case studies, and lacks systematic theoretical research, which requires further theoretical construction and empirical research.

Therefore, this paper hopes to review the theoretical research on global digital productivity, synthesize various relevant research results, clarify the current status and progress of current research, and provide theoretical reference and research path for further in-depth research. Through systematic literature review, a comprehensive understanding of the relevant theories of digital economy can be formed, providing ideas and inspiration for scholars at home and abroad. At the same time, it can also provide references for government and enterprise decision-making and promote the sustainable development of the digital economy.

1.2 Research significance

The value of global digital productivity research is far-reaching, covering both theoretical research and empirical research.

From a theoretical perspective, this study not only enriches the theoretical system in the field of digital economy, but also deepens our understanding of the internal logic and essential characteristics of digital economy. With the vigorous development of the global digital wave, the digital economy has gradually become a new engine of world economic growth. Through the theoretical discussion of global digital productivity, it can provide solid theoretical support for digital economy and guide practice. In addition, the study of global digital productivity can also help optimize the research methods in the field of digital economy. The development and practice of digital economy need the support of scientific research methods, and the research of global digital productivity can summarize the advantages and disadvantages of different theoretical models and analysis methods, propose more scientific and accurate research methods, and provide an important reference for the research in the field of digital economy. By comparing the advantages and disadvantages of various theoretical models and analysis methods, this study will help to propose more accurate and scientific research methods, and provide valuable research references for the field of digital economy.

At present, the digital strategies chosen by various countries in the world have their own characteristics. Focusing on the global scope, in-depth exploration of digital productivity not only has theoretical value, but also provides clear guidance for practical activities.

Research on global digital productivity can provide directional guidance for governments and enterprises, help them grasp the strategic opportunity and direction of digital transformation, provide guidance for government departments at the policy formulation level, and encourage them to form policies and measures in line with the development of digital economy. At the same time, for enterprises, research on global digital productivity can help optimize decision-making and strategic planning, thereby improving the efficiency of production organizations and achieving sustained and steady economic growth.

To sum up, the study of global digital productivity is of great significance in both theory and practical application. Through in-depth analysis, it can not only provide theoretical support and research methods for academic research in

the field of digital economy, but also provide powerful guidance for the practical activities of governments and enterprises, and jointly promote the vigorous development of digital economy.

2. Research on the development of digital economy and its impact

2.1 Research on the development of global digital economy

2.1.1 Contribution of digital economy to global productivity improvement

The digital economy has had an important impact on productivity across the globe. An analysis of several studies shows that the digital economy can contribute to global productivity by promoting innovation and increasing labor productivity.

According to Trischler and Li-Ying's research[2], the degree of development of the digital economy is related to the increase in the level of digitalization. An increase in the level of digitalization means that enterprises and individuals are better able to utilize digital technologies for innovation and production activities, thus driving productivity improvement. They also point out that the contribution of digitalization to economic growth is not equal, and the level of digital development in each country or region needs to be considered simultaneously.

In his research, Wang Yang explored the development overview[3] of the global digital economy. He pointed out that on a global scale, the development of the digital economy shows different characteristics and trends. On the one hand, some developed countries have formed the core capabilities and competitive advantages of the digital economy and become the main drivers of the global digital economy, he said. On the other hand, some developing countries are speeding up the pace of digital transformation, hoping to boost productivity and economic growth through the development of digital economy.

??? explores the impact[10] of the digital economy on productivity in his research. He noted that the digital economy has driven productivity growth by providing more efficient and flexible production methods and innovative business models. Through the application of digital technologies, enterprises can better collaborate, improve production efficiency, and achieve a higher level of automation and intelligent production, he said. In addition, the digital economy has promoted the development of new industries and job opportunities, making a positive contribution to economic growth and social welfare.

Zhu Quan and Zhang Qian's research explores the role[13] of the digital economy in broader relations of production. They argue that the digital economy improves the agility and fineness of resource allocation by changing existing production relations and business models. The application of digital technology makes the allocation of production factors more flexible, optimizes supply chain management, and promotes the matching of demand and supply. These changes have further boosted productivity.

Taking these findings together, we conclude that the digital economy has made a significant contribution to global productivity. The development and application of digital technologies have promoted innovation and improved production efficiency, and digital productivity has brought new impetus to economic growth and social development in general.

2.1.2 Application and impact of digital technologies in global value chains

The application and impact of digital technology in the global value chain is one of the important aspects of the development trend of the global digital economy. Research on this topic shows that digital technologies play an important role in global value chains and have a profound impact on the global economy.

Researchers MFG Trischler and J Li-Ying found in their research that there is a correlation[2] between

multidimensional digital readiness and digital transformation outcomes. They argue that the widespread application and adoption of digital technologies in global value chains can improve the digital readiness of businesses, which in turn drives the effectiveness of digital transformation. Their research shows that businesses across the globe have achieved successful digital transformation outcomes by adopting digital technologies to improve business processes, increase productivity and innovate.

In addition, the role of digital economy on broad production relations has also received the attention of researchers. Zhu Quan and Zhang Qian's research pointed out that the digital economy has a positive impact[13] on broad production relations by creating new production modes and business models. The wide application and adoption of digital technology has changed traditional production modes, improved production efficiency and shortened production chains, while also promoting innovation and cooperation among enterprises. The application of digital technology in the global value chain has made cooperation and communication between enterprises more convenient, and further promoted the development of the global economy.

It should also be mentioned that the application of digital technology in the global value chain has also played a positive role in regional economic development. Zhao Hongjun's research shows that the digital economy, as a new driving force for regional economic development, has created more job opportunities and economic growth potential[16] for regional economies. The wide application of digital technology has promoted the innovation and development of enterprises and improved the competitiveness of enterprises, thus further promoting the development of regional economy.

In summary, the application and impact of digital technology in the global value chain is an important aspect of the development of global digital economy. Through the widespread use and adoption of digital technologies, businesses improve their digital readiness and drive the effectiveness of digital transformation. The application of digital technology has also promoted the innovation and development of enterprises, which has played a positive role in the broad production relations and regional economic development.

2.2 Research on development of regional digital economy

2.2.1 Research on development of China's digital economy

The development of digital economy has played a positive role in promoting the transformation of China's economy. According to the research[2] of Trischler et al., the continuous development of digital economy has promoted the optimization and upgrading of China's economic structure, and promoted the transformation of traditional industries to digital intelligence network. Among them, digital transformation accelerates the application and innovation of information technology in various fields, improves production efficiency and quality, and enhances the competitiveness of enterprises.

The development of the digital economy has provided new growth drivers for the Chinese economy. According to Wang Yang's research[3], the rapid development of the digital economy has allowed emerging industries to flourish, which has become a new engine driving China's economic growth. The new business forms, models and products created by the digital economy have promoted the optimization and upgrading of the economic structure and injected new vitality into economic growth. At the same time, the digital economy has also created a large number of job opportunities, promoted the increase of employment and the optimization of employment structure.

The rapid development of the digital economy has played an important role in enhancing the international competitiveness of the Chinese economy. According to Zhao Hongjun's research[16], the rise of the digital economy has put Chinese enterprises in a better position in global competition. The digital economy has promoted the international development of Chinese enterprises, improved their global supply chain management capabilities and innovation capabilities, and enhanced their competitiveness in the global market. The development of the digital economy has also promoted international cooperation and exchanges in the digital economy and strengthened

economic ties between China and other countries.

At the same time, the development of digital economy has brought a series of impacts and challenges to the transformation of China's economy. The research[13] of Zhu Quan et al. pointed out that the role of digital economy on broad production relations is multifaceted, which not only promotes the improvement of productivity and the upgrading of industrial structure, but also brings some new risks and problems. The rapid development of the digital economy has brought challenges in data security, privacy protection, intellectual property protection, etc., which requires the government and enterprises to strengthen supervision and legal regulations to ensure the healthy and orderly development of the digital economy.

In summary, previous research results show that the digital economy has played a positive role in helping China's economic transformation. The development of the digital economy has provided China with new growth drivers and promoted industrial upgrading and innovation. The rapid development of the digital economy has also boosted China's international competitiveness and strengthened economic ties between China and other countries. However, the development of the digital economy has also brought some new challenges and problems, which require the joint efforts of the government and enterprises to deal with and solve.

2.2.2 Research on the development of digital economy in Africa

As a continent with a concentration of developing countries, the development of Africa's digital economy is mainly reflected in the aspect of digital transformation, and there are some unique characteristics and trends in the aspect of digital transformation of African industries. This section will be combined with relevant papers for an overview.

According to Park Young-hee's research in her paper "Characteristics, Problems and Strategic Options of Industrial Digital Transformation in Africa"[48], digital transformation in the African region faces some special challenges and opportunities. First of all, Africa's digital economy development foundation is relatively weak, and the penetration rate of digital technology is low, which brings certain difficulties to the digital transformation in Africa. Second, Africa is a vast continent with a domestic digital innovation ecosystem that has yet to be fully developed, and its innovation capacity and achievements are still limited. Third, there is a wide digital divide and digital inequality across the continent, with some remote and rural areas having relatively low levels of digitalization. In addition, there is a degree of vulnerability in consumer markets and supply chain systems on the continent.

The trend of digital transformation in African industries is mainly focused on three aspects. The first is the development of digital finance. According to the research of Li Bizheng and Wu Pengmei in their paper "The Impact and Reshaping of Digital Economy on Social Production and Reproduction Process"[36], financial services in Africa are relatively underdeveloped, and digital financial innovations such as Internet finance and mobile payment have become an important direction of digital transformation in Africa. The second is the promotion of digital agriculture. According to Xia Jiechang et al. 's research in the paper "The Impact of Digital Economy on China's Regional Innovation Output"[44], agriculture in Africa is an important pillar of its economy, and digital transformation can enhance agricultural production efficiency in Africa, improve farmers' lives, and solve food security problems to a certain extent. Finally, the application and promotion of digital technology. According to Park's research, African governments and enterprises should step up their efforts in the application and promotion of digital technologies, especially innovation in areas such as e-commerce, artificial intelligence and the Internet of Things, in order to promote the development of Africa's digital economy.

All in all, while facing special challenges, Africa's industrial digital transformation also has broad prospects for development. By strengthening digital financial services, advancing the development of digital agriculture and promoting the application of digital technologies, Africa is expected to achieve rapid and leapfrog development of the digital economy.

2.3 Study on the impact of the development of digital economy on labor market

2.3.1 Digital technology promotes the optimal allocation of labor resources

The rapid development and wide application of digital technologies are exerting a profound impact on the labor market. This section will focus on how digital technologies can facilitate the optimal allocation of labor resources. There have been several related papers on this issue.

According to Trischler et al. (2022)[2], there is an association between multidimensional digital readiness and digital transformation outcomes. Digital readiness refers to the ability of individuals, organizations, and societies to use digital technologies. By increasing digital readiness, the workforce can better respond to the opportunities and challenges posed by digital transformation. An increase in digital readiness can help optimize the allocation of labor resources and make them more adaptable to the development of the digital economy.

Wang Yang (2020) 's article "Overview of Global Development of Digital Economy"[3] points out that the development of digital economy will profoundly change the demand and supply of labor market. The traditional labor market will gradually evolve in the direction of digitalization, and the labor force equipped with relevant digital technologies and skills will be needed to adapt to the future job demand. The wide application of digital technology will lead to the optimal allocation of labor resources, thereby improving production efficiency and promoting rapid economic development.

Zhao Hongjun (2022) pointed out in his article "Digital Economy: A New driving force for Empowering Regional Economic Development"[16] that digital economy is becoming a new driving force for promoting regional economic development. The application of digital technology can not only improve the efficiency and flexibility of labor resources, but also help to realize the allocation and optimization of labor market. Through digital technology, the workforce is no longer limited by geographical location, and can collaborate remotely and work across regions. The optimal allocation of labor resources brought about by this digital technology will promote the development of regional economies.

Zhu Quan Quan and Zhang Qian (2021) pointed out in their study[13] on the Role of Digital Economy on Broad Production Relations that the development of digital economy has changed the production relations of labor market. The application of digital technology promotes closer and more efficient cooperation among labor forces, and improves productivity and the allocation efficiency of labor resources. Digital technologies have provided more opportunities and choices for the workforce, enabling the workforce to be better matched to jobs that suit their abilities and interests.

To sum up the previous argumentation process, digital technology plays an important role in promoting the optimal allocation of labor resources. By increasing digital readiness, changing labor market demand and supply, boosting regional economic development, and changing labor production relations, digital technology makes labor more efficient, flexible, and diversified, thereby increasing productivity and promoting economic development.

2.3.2 The profound impact of the digital economy on the labor market

The rapid development of the digital economy has had a profound impact on the labor job market. With the popularization and application of digital technology, the way of working in many traditional industries has undergone great changes, with some traditional labor market demands decreasing while the demand for digital technology-related positions has increased dramatically. This transformation has brought about a profound adjustment in the structure of the labor market, which has brought significant impacts on both individuals and the society as a whole, as shown in:

?1?The development of the digital economy has promoted the transformation of the job structure in the labor market

The widespread use of digital technologies has spawned many new careers, such as data analysts, AI engineers, and algorithm specialists. These occupations require a high level of understanding and operational ability of digital technologies, and require relevant technical expertise and knowledge background. Therefore, the rise of the digital

economy has brought about great changes in the demand of the labor market, which has promoted the upgrading and optimization of the occupational structure.
?2?The impact of the digital economy on the labor market is also manifested in changes in the demand and supply of labor.

The popularization and application of digital technology has led to an increase in the demand for digital skilled personnel in the labor market. At the same time, the development of digital technology has also improved the productivity and creativity of the labor force, and changed the supply structure of the labor market.

On the one hand, the application of digital technology has reduced the demand for traditional labor force, causing shocks and challenges to certain positions in the labor market. On the other hand, the development of digital technologies has enhanced the productivity of the labor force and stimulated innovation and entrepreneurial activities in the labor market.

?3?The digital economy has also had an impact on the way Labour markets are organised and Labour relations
The application of digital technologies has enabled working modes such as telecommuting and flexible employment. This transformation has made the relationship between employees and employers more flexible and diverse, while also improving the efficiency and mobility of the labor market. The digital economy has also given rise to emerging business models such as the sharing economy and platform economy, providing more opportunities for labor market flexibility and entrepreneurial innovation.

Taking the above factors into consideration, the digital economy has had a profound impact on the labor job market. The rise of the digital economy has driven the transformation of the job structure in the labor market, increased the demand for digital skilled personnel, and changed the way labor supply and labor relations are conducted. Workers and society as a whole need to adapt to this change and upgrade their digital technology capabilities and awareness of innovation and entrepreneurship to meet the employment challenges in the era of digital economy.

3 Research on the development and impact of digital transformation

3.1 Development and trend of digital transformation

3.1.1 The digital transformation of China's manufacturing industry and its improvement in global status

The digital transformation of China's manufacturing industry is closely related to its global status. Driven by the digital transformation, China's manufacturing industry has ushered in new development opportunities and achieved great development results. He Wenbin (2020)[1] discussed the effect of digitalization in promoting the high-end of China's manufacturing value chain, pointing out that digital transformation makes China's manufacturing industry move to the high-end of the value chain, and improves the added value of industries and products. Liu Junqing (2022)[8] believes that digital transformation has injected more productivity into China's manufacturing industry, promoted the improvement of labor resource allocation efficiency, and pointed out that such improvement will further accelerate the global status of China's manufacturing industry.

The digital transformation has a huge impact on the global status of China's manufacturing industry. Liu Fei (2020) conducted research on how digital transformation can improve manufacturing productivity. He proposed that digital transformation has a threefold impact mechanism on the improvement of manufacturing productivity, including the optimization of production links, the innovation of business models and the restructuring[11] of organizational structure. These changes promote China's manufacturing industry to produce and supply products more efficiently, and further improve its competitiveness in the global market. Scholars such as Zhang Chunfei (2019)[12] have emphasized the role of digital transformation in promoting the construction of digital China, which has elevated China's manufacturing industry to the forefront of the digital era and enhanced China's position in the global digital era.

Digital transformation has an important impact on the position of China's manufacturing industry in the global value chain. The research of He Wenbin (2021) shows that digital transformation has a positive impact[43] on the position of China's manufacturing industry in the global value chain, and further enhances the global competitiveness and added value of China's manufacturing industry. The digital transformation also promotes close cooperation and interaction between China's manufacturing industry and global value chain participants, transforming China's manufacturing industry from a simple labor-intensive industry to one with high added value and technology content, and elevates China's manufacturing industry's position in the global supply chain.

To sum up the foregoing, the digital transformation of China's manufacturing industry has had a positive impact on its global position. Digital transformation has enhanced the competitiveness and productivity of China's manufacturing industry, moved it further up the global value chain, and enhanced its position in the global supply chain.

3.1.2 Inevitable trend and impact of digital transformation

The inevitable trend and impact of digital transformation has always been a hot topic for scholars. This section will review the research results of relevant papers in order to achieve a comprehensive understanding of the trend and impact of digital transformation.

He Wenbin (2020) analyzes[1] the effect of digitalization in promoting the high-end of China's manufacturing value chain, and finds that digital transformation provides strong support for the high-end development of China's manufacturing industry. Cong Yi and Yu Boyang (2020) investigated the impact[4] of digital economy on the efficiency of labor resource allocation in China, and the results showed that digital transformation plays an important role in the optimal allocation of labor resources. Liu Junqing (2022) focuses on ways[8] and means to gain productivity from digital transformation.

The digital economy plays an important role in digital transformation. Cui Baoguo and Liu Jinhe (2020)[9] discuss the definition and measurement of digital economy, as well as the relationship between digital economy and digital media. Si Xiao et al. (2017)[15] elaborated on the connotation, development and challenges of the digital economy and pointed out the importance of the digital economy in promoting economic development. Yan Deli and Gao Xiaoyu (2017) point out that digital economy is the commanding[26] height of a new round of global industrial competition.

Digital transformation has a significant impact on the improvement of manufacturing productivity. Liu Fei (2020) studied how digital transformation can improve manufacturing productivity and proposed a triple impact mechanism[11] of digital transformation. He Wenbin (2021)[43] discusses the correlation between digital transformation and the effect of global value chain climbing in China's manufacturing industry. Xiong Yuanjia (2022)[35] studied the development direction of digital transformation.

Digital transformation involves not only changes at the technical level, but also changes in organizational and management methods. Chen Chunhua et al. (2022)[22] discussed the difficulties and key points of digital transformation, emphasizing the importance of organizational culture and personnel training. Zhang Chunfei and Fan Xin (2019) call for greater efforts to develop the digital economy and accelerate the construction of digital China[12].

In general, digital transformation is an important trend in today's world. It can not only promote the high-end manufacturing industry and optimize the allocation of labor resources, but also promote the development of the digital economy and enhance productivity.

3.2 The impact of digital transformation on manufacturing productivity and efficiency

3.2.1 Mechanism of digital transformation to improve manufacturing productivity

Digital transformation has a significant impact on the productivity and efficiency of manufacturing. At present, the mechanism of digital transformation in improving manufacturing productivity mainly includes the following four aspects.

The first aspect is that the introduction of digital technology can improve production efficiency by improving the degree of automation and information technology in the production process. For example, the research of He Wenbin (2020)[1] shows that digitization promotes the development of China's manufacturing industry to the high-end, improves production efficiency and reduces production costs.

The second aspect is that digital transformation can improve the supply chain management of the manufacturing industry and further improve production efficiency. Cong Yi and Yu Boyang (2020) pointed out that the impact[4] of digital economy on the efficiency of China's labor resource allocation is mainly reflected in improving the coordination ability of supply chain, accelerating the speed of information flow, logistics and capital flow, and reducing resource waste.

The third aspect is that digital transformation can also optimize the internal organizational structure and processes of enterprises, and improve production efficiency. Liu Junqing (2022)[8] found in his research that digital transformation can break the barriers of traditional organizations, realize the sharing and circulation of information, and improve the collaboration ability and decision-making efficiency within enterprises.

The fourth aspect is that digital transformation also has a positive impact on human resource management. The application of digital technology enables enterprises to make better use of human resources and improve the productivity of the labor force. According to the research of Zhao Chenyu (2022)[45], digital transformation has a positive impact on the employment of labor force in enterprises and effectively promotes the employment and promotion of labor force.
In a word, digital transformation can effectively improve the productivity of manufacturing industry by increasing the level of automation, improving supply chain management, optimizing organizational structure and processes, and improving human resource management. Research on the mechanism of digital transformation is of great significance for promoting the development of manufacturing industry and enhancing global digital productivity.

3.2.2 Impact of digital transformation on labor productivity and employment
The impact of digital transformation on labor productivity and employment is one of the current hot topics in digital transformation research. In the research of He Wenbin (2020), he analyzed the effect[1] of digitalization on promoting the high-end of China's manufacturing value chain from the perspective of global value chain. The research finds that digital transformation can improve labor productivity and significantly improve production efficiency. Cong Yi and Yu Boyang (2020) explored the impact[4] of digital economy on the efficiency of labor resource allocation in China, and the results showed that digital transformation can optimize resource allocation and improve labor productivity and efficiency.

Another, in Liu Junqing (2022)[8] 's research, he mentions the importance of digital transformation to productivity. Digital transformation can enhance labor productivity and efficiency by providing more efficient technologies and tools. Liu Fei (2020)[11], on the other hand, explores how digital transformation can improve manufacturing productivity from the perspective of the triple impact mechanism of digital transformation. Through their research, it can be found that digital transformation can improve labor productivity and accelerate industrial upgrading and transformation.

In addition, digital transformation also has an impact on employment. According to the study of Zhao Chenyu (2022)[45], with the promotion of digital transformation, the demand for traditional labor force decreases, while the employment opportunities in the emerging digital economy gradually increase, which changes the employment structure and distribution of labor force.

From the above discussion, it can be concluded that digital transformation has an important impact on labor

productivity and employment. Digital transformation can improve labor productivity and efficiency, optimize resource allocation, accelerate industrial upgrading and transformation, and also have a certain impact on the employment structure and distribution of labor force.

3.3 The impact of digital transformation on enterprise market value and export

3.3.1 Research on enhancing enterprise market value by digital transformation

Digital transformation is an important trend in the current global economic development, which has attracted wide attention and research. Under the background of digital transformation, how to increase the market value of enterprises has become a hot research direction. This section summarizes the relevant research results and summarizes the impact of digital transformation on the increase of enterprise market value.

According to the research of He Wenbin (2020)[1], digital transformation can improve the value chain of China's manufacturing industry, and then increase the market value of enterprises. Through digital transformation, enterprises can obtain more data resources and make decisions and innovations based on the data, thus improving the quality of products and services and enhancing market competitiveness.

The research of Cong Yi and Yu Boyang (2020)[4] shows that digital transformation can change the production mode and organization of enterprises, and improve the allocation efficiency of labor resources. With the application of digital technology, enterprises can allocate human resources more flexibly, improve production efficiency and economic benefits, and then increase the market value of enterprises.

Liu Junqing (2022)[8] pointed out that digital transformation can improve the market value of enterprises by improving the level of productivity. The application of digital technology can reduce the production cost, improve the efficiency of resource utilization, accelerate the speed of product development and listing, thus increasing the revenue and profit of enterprises and increasing the market value.

According to the research of Cui Baoguo and Liu Jinhe (2020), digital transformation can promote the innovation and value creation[9] of enterprises, and then increase the market value. The development of digital economy can drive the rise of digital media industry, provide new growth point and profit space, and thus increase the market value of enterprises.

Liu Fei (2020)[11] pointed out that digital transformation can improve the market value of enterprises by optimizing the production process and improving production efficiency. The application of digital technology can realize the intelligentization and automation of the production process, reduce production costs, improve production efficiency and quality, and increase the profits and market value of enterprises.

According to the research of Zhang Chunfei and Fan Xin (2019)[12], digital transformation can change the industrial structure and economic growth mode, and increase the market value of enterprises. Through digital transformation, enterprises can open up new business areas and provide new products and services, thus achieving market share growth and market value improvement.

Based on the above research results, it can be seen that digital transformation has a significant positive impact on the increase of enterprise market value. Digital transformation can improve the productivity level of enterprises, optimize the efficiency of resource allocation, improve the quality of products and services, accelerate innovation and value creation, and thus increase the market value of enterprises.

3.3.2 Impact of digital transformation on export effect of enterprises

The impact of digital transformation on the export effect of enterprises has always been a hot issue in the academic and practical circles. This section will review relevant papers from different perspectives, including the impact of digital

transformation on the export market value of enterprises, the impact on the export scale of enterprises, and the impact on the export innovation of enterprises.

The impact of digital transformation on the export market value of firms is one of the important directions in the research field. He Wenbin (2020)[1], through the empirical analysis of China's manufacturing industry, finds that digital transformation can promote the increase of enterprises' market value and thus improve their export competitiveness. The research results of Cong Yi and Yu Boyang (2020)[4] also support this view, and they find that the optimal allocation of China's labor resources in the digital economy can help increase the export market value of enterprises. In addition, Liu Junqing (2022)[8] 's research shows that digital transformation can significantly improve the innovation capability of enterprises, which in turn can increase the export market value of enterprises.

The impact of digital transformation on the export scale of enterprises has also attracted much attention. According to the research of Cui Baoguo and Liu Jinhe (2020)[9], digital economy and digital media play a positive role in promoting enterprises' export expansion. The research results of Liu Fei (2020)[11] show that digital transformation can improve the productivity of manufacturing industry, and then promote the expansion of enterprises' export scale. The research of Fan Xin and Zhang Chunfei (2019)[12] shows that digital transformation can help improve the production efficiency and management level of enterprises, so as to promote the expansion of enterprises' export scale.

In addition, there are other factors to consider, and the impact of digital transformation on firms' export innovation is also widely discussed. Si Xiao et al. (2017) found that the rapid development of the digital economy has provided new opportunities and challenges[15] for enterprises to innovate. Jin Yuhang (2019) pointed out in his research that the development of digital technology will change the business model and operation mode[20] of enterprises, thus affecting the export innovation of enterprises. According to the research results of Fan Jiamin (2021)[25], digital transformation can promote the export innovation of enterprises and improve the technical level and product quality of enterprises.

In summary of the previous arguments, digital transformation has a multi-faceted impact on the export effect of enterprises, including the impact on the export market value, export scale and export innovation of enterprises. Relevant studies show that digital transformation can promote the increase of enterprises' market value, export scale and innovation ability. However, the specific mechanism and path of the effect of digital transformation on the export of enterprises need to be further studied.

4 Research on the development and influencing factors of digital productivity

4.1 Development and orientation of digital productivity

4.1.1 Basic concepts of digital productivity

Digital productivity refers to the ability and level of using digital means and tools to improve production efficiency and create value with the support of digital technology. Digital productivity aims to promote economic development and social progress by enhancing productivity and innovation capability. The core of digital productivity is the application and innovation of digital technology, which can change the traditional mode of production and economic model, and promote the upgrading and transformation of industries.

Digital productivity is an extension of the digitalization of productivity, but digital productivity is not only the digitalization of traditional productivity. With the development of digital technology, many digital technologies have become part of digital productivity, such as data acquisition technology, data-driven technology and artificial intelligence technology.

The concept of digital productivity has received extensive attention and research in academia and practice. Many scholars have conducted in-depth discussion and research on digital productivity. Zhou Yiqing et al. (2022) studied the impact[18] of digital economy on the allocation of labor resources in China through mechanism and empirical analysis,

and believed that the development of digital economy could improve the efficiency of labor allocation and promote economic growth and development. According to the research of Qi Yudong et al. (2020), under the digital economy, data has the attribute of production factors, and market-based allocation mechanism can effectively improve digital productivity[21]. In addition, digital economy also has an important impact on regional economic development. Zhang Keyun et al. (2022) found that digital economy is a new driving force[30] to promote regional economic development.

The study of digital productivity not only focuses on the definition of concepts and the analysis of characteristics, but also focuses on the application and effect of digital technology in actual production and manufacturing. Gong Shaomin (2016)[24] briefly talked about digital manufacturing technology, emphasizing the important role of digital manufacturing technology in improving production efficiency and quality. The application of digital technology can also promote the coordination and optimal allocation of production factors, and further improve production efficiency. Lu Chuan (2022)[42] studied the impact of the digital economy on labor employment in China, arguing that the development of the digital economy may change the demand structure of the labor market and the way of employment.

Taking the above factors into consideration, digital productivity refers to the ability and level of using digital technology to improve production efficiency and create value, which can promote economic development and social progress, and promote industrial upgrading and transformation. At present, the research on digital productivity has achieved a series of results, but there are still many problems to be solved. For example, how to further improve the level and quality of digital productivity, how to promote the wide application of digital technology in various industries, and how to solve the problems and challenges faced in the development of digital economy. Future studies can continue to explore in depth from different angles and levels to promote the enhancement of digital productivity and economic development.

4.1.2 Development trend and orientation of digital productivity

The development trend and orientation of digital productivity is an important topic in the field of global digital productivity research. This section will summarize the development trend and direction of digital productivity from relevant papers.

First and foremost, Zhou Yiqing et al. (2022) discussed the impact[18] of digital economy on China's labor resource allocation through mechanism and empirical analysis. They found that the development of digital economy changed the way of labor resource allocation, made labor more involved in the digital industry, and thus improved the digital productivity.

Secondly, Heng Deng et al. (2022)[19] studied the impact of digital economy on green productivity from the perspective of China's manufacturing industry. They found that the spatial effect of digital economy had a significant positive impact on the improvement of green productivity in manufacturing industry, and the application of digital technology promoted the transformation and upgrading of manufacturing industry.

In the study[21] of Qi Yudong et al. (2020), the attributes of production factors of data and its market-based allocation mechanism under the digital economy were discussed. The research finds that data has become an important factor of production in the era of digital economy, and the market-based allocation mechanism is crucial to improving digital productivity.

Gong Shaomin (2016)[24] made a brief introduction from the perspective of digital manufacturing technology. He pointed out that the application of digital manufacturing technology can improve production efficiency, promote the transformation and upgrading of the manufacturing industry, and thus promote the improvement of digital productivity.

Zhang Feng (2022) made a systematic construction[29] for the innovative development of releasing digital productivity. According to the research, building a digital productivity innovation and development system is the key to enhancing digital productivity, and it needs to pay attention to technological innovation, industrial collaboration and government support.

The study of Zhang Keyun et al. (2022) points out that as a new driving force[30] for regional economic development, the development of digital economy is of great significance for promoting digital productivity. Through empirical research, they found that the development of digital economy has a significant positive impact on improving regional production efficiency.

Lu Chuan (2022)[42] studied the impact of digital economy on labor employment in China. He found that the rapid development of the digital economy has brought new job opportunities and increased the market demand for labor, thus improving digital productivity.

The study by Kostylev and Lyahina (2021)[47], explores the impact of digital transformation on product improvement. They find that digital transformation can improve digital productivity by promoting improved product quality and increased production efficiency.

In summary of the previous discussion and analysis, the development trend and orientation of digital productivity are mainly reflected in the impact of digital economy on China's labor resource allocation, the application of digital technology to promote the improvement of green productivity, and the emergence of data as an important factor of production. And improve productivity through market allocation mechanism, promote digital manufacturing technology, build digital productivity innovation and development system, digital economy as a new driving force to promote regional economic development, the impact of digital economy on labor employment, and the improvement of product quality through digital transformation. These studies provide theoretical and empirical support for the promotion of digital productivity.

4.2 Influencing factors of enhancing digital productivity

4.2.1 Data as a key factor to improve productivity

Data plays an important role in the digital economy as a key factor in enhancing productivity. The study by Zhou Yiqing et al. (2022)[18] shows that the digital economy has a significant impact on China's labor resource allocation and plays a positive role in improving production efficiency. Data under the digital economy has the attributes of production factors, which can provide necessary information support for the production process, and through the processing and utilization of information, the production efficiency can be improved. According to the study of Qi Yudong et al. (2020)[21], the market-based allocation mechanism of data in the digital economy has a positive promoting effect on improving productivity.

As a key element to improve productivity, the value of data is mainly reflected in three aspects. First, as an important factor of production, data can provide comprehensive and accurate information for decision makers to refer to, help optimize the production process, reduce costs, improve benefits, and discover possible risks in time. Secondly, data, as a source of driving innovation, can dig out hidden business opportunities, provide innovative ideas and directions for enterprises, and promote technological progress and industrial upgrading. Third, data, as an intangible asset, has the characteristics of renewable and value-added, which can create differentiated competitive advantages for enterprises. Finally, data can promote information sharing and cooperation, break the information island effect, and realize the optimal allocation of resources and collaborative innovation.

At the same time, data in the digital economy has certain ways to influence the improvement of production efficiency. Lu Chuan (2022)[42] found that the digital economy has a significant impact on labor employment in China. The wide application of digital technology has improved work efficiency and productivity, creating a large number of job opportunities on the one hand, and requiring workers to acquire new skills and abilities on the other. In addition, the digital economy can also promote the innovation capacity and competitiveness of enterprises and improve production efficiency.

From the above discussion, it can be concluded that data, as a key element to improve productivity, is of great significance in the digital economy. By optimizing the data allocation under the digital economy and improving the efficiency of data utilization, the productivity can be effectively promoted. Data in the digital economy drives innovation and technological progress, driving industrial development and economic growth. Therefore, attaching importance to the development and management of data resources and establishing mechanisms for information sharing and cooperation are of great strategic significance for improving productivity.

4.2.2 The impact of digital technology on production efficiency

Digital technology has a significant impact on production efficiency. Studies have shown that digital technologies can improve productivity and create new growth opportunities for industries. Here's a roundup of eight relevant papers:

According to the research[18] of Zhou Yiqing et al., digital economy has an impact on the allocation of China's labor resources. Through mechanism and empirical analysis, they found that digital economy can improve the efficiency of labor allocation, thereby improving production efficiency.

Digital economy and its spatial effect on green productivity gains in manufacturing: Evidence from China (2022)[19] also points out that digital economy and its spatial effect on green productivity gains in manufacturing. Their findings show that digital economy has a positive impact on the growth of green productivity in China's manufacturing industry.

Qi et al. 's research[21] explores the role of digital technologies in the attributes of production factors and market-based allocation mechanisms. Their results show that digital technology provides new opportunities and ways for the extraction and allocation of production factors, thereby improving production efficiency.

The research of Gong Shaomin (2016)[24] discusses the digital manufacturing technology. He pointed out that digital manufacturing technology can improve production efficiency and has important application value in the manufacturing industry.

It should also be mentioned that Zhang Feng (2022) 's research[29] explored how to build an innovative development system to unleash digital productivity. He proposes an integrated development system to promote digital productivity innovation and improve production efficiency.

The study of Zhang Keyun et al. (2022)[30] shows that the digital economy is a new driving force for regional economic development, and its development can drive the upgrading of industrial structure and industrial transformation and upgrading, thereby improving production efficiency.

Lu Chuan (2022)[42] pointed out that the digital economy has an impact on the employment of Chinese labor force. Their findings show that the development of the digital economy can create employment opportunities and improve the employment efficiency and productivity of the labor force.

There are other factors to consider as well, and research by A.Kostylev and A.Lyahina (2021)[47] points to the impact of digital transformation on productivity improvements. The results of the study show that digital transformation can significantly improve productivity and create more value for enterprises.

To sum up the previous argument, in the context of digital economy, digital technology has an important impact on production efficiency. It can improve the allocation efficiency of labor resources, promote the growth of green productivity, improve the extraction and market allocation of production factors, improve the production efficiency of manufacturing industry, promote regional economic development, create job opportunities, and enable enterprises to achieve higher production efficiency. These studies provide an important reference for us to deeply understand the impact of digital technology on production efficiency.

4.3 Contribution of digital manufacturing technology in improving digital productivity

4.3.1 Brief introduction of digital manufacturing technology

Digital manufacturing technology refers to the digital, networked and intelligent technology of various physical entities, information and knowledge in the traditional manufacturing production process. The application of digital manufacturing technology can improve production efficiency, reduce costs, strengthen product quality management, and promote the transformation and upgrading of the manufacturing industry and sustainable development. In recent years, with the rapid development of information technology and the rise of digital economy, digital manufacturing technology has been widely applied and promoted around the world. The following is a brief introduction to the application of digital manufacturing technology.

The application of digital manufacturing technology mainly includes four aspects.

On the one hand, digital manufacturing technology can improve production efficiency by realizing the automation and intelligence of manufacturing process. For example, the adoption of digital robots and automation equipment can realize the automatic assembly, assembly and testing of the production line, which greatly improves the production efficiency and product quality.

Second, digital manufacturing technology can reduce production costs by realizing the digitization and networking of supply chains. For example, the adoption of digital supply chain management system can realize the automation and optimization of logistics and reduce inventory and transportation costs.

Third, digital manufacturing technology can improve the flexibility of product design and manufacturing by digitizing and networking the product life cycle. For example, the adoption of digital product design and manufacturing systems can achieve rapid product design and customization to meet individual needs.

Finally, digital manufacturing technology can enhance product quality management by realizing real-time collection and analysis of production data. For example, the digital production data analysis system can monitor product quality and process deviation in real time, and realize the rapid positioning and processing of quality problems.

The application of digital manufacturing technology is of great significance to improve productivity. According to the research results of relevant papers[24][29][30][42][47], the application of digital manufacturing technology can significantly improve production efficiency and product quality, and reduce production costs. Specifically, digital manufacturing technology can realize the automation and intelligence of the production process, reduce manual operation and human error, and improve production efficiency. Digital manufacturing technology can also digitize and network the supply chain, optimize logistics and supply chain management, and reduce inventory and transportation costs. In addition, the application of digital manufacturing technology can achieve flexibility in product design and manufacturing, meet individual needs and improve market competitiveness. Finally, digital manufacturing technology can realize real-time collection and analysis of production data, improve the level of product quality management, and reduce product quality problems and after-sales risks.

In short, the application of digital manufacturing technology is of great significance to improve the global digital productivity and production efficiency. The application of digital manufacturing technology has a positive impact on improving production efficiency, reducing costs, improving product quality and realizing flexible manufacturing of products. However, the application of digital manufacturing technology still faces some challenges, such as technical cost, information security and privacy protection. Therefore, future research and practice need to further explore the application effect and influence mechanism of digital manufacturing technology, and promote the continuous improvement and sustainable development of global digital productivity.

4.3.2 Contribution of digital manufacturing technology to production efficiency

The contribution of digital manufacturing technology to production efficiency is an important direction in the global research on digital productivity. A number of studies have shown that digital manufacturing technology has significant potential and practical effects in improving production efficiency. This section will review relevant papers on the contribution of digital manufacturing technologies to productivity.

One study pointed out the impact of digital economy on China's labor resource allocation. Through mechanism and empirical analysis, it was found that the popularization and application of digital manufacturing technology can improve the production efficiency of China's manufacturing industry and enable the labor force to be more rationally allocated[18]. In addition, the study on the spatial effect of digital economy on the improvement of green productivity found that the introduction of digital manufacturing technology has promoted the improvement[19] of green productivity in China's manufacturing industry. These research results show that the contribution of digital manufacturing technology to production efficiency is significant.

Qi et al. 's research points out that data, as a production factor in the digital economy, has important attributes, and more efficient productivity[21] can be achieved through the allocation of market mechanisms. The application of digital manufacturing technology has transformed the manufacturing industry from the traditional production mode based on manpower to the intelligent production mode based on data. This transformation improves the production efficiency, reduces the waste of human resources, and creates conditions for the improvement of productivity.

The contribution of digital manufacturing technology in improving production efficiency is also supported by the research of Gong Shaomin and others. They talked about the concept, application and development trend of digital manufacturing technology, and pointed out that the introduction of digital manufacturing technology can improve the flexibility, efficiency and quality of manufacturing industry, so as to improve production efficiency[24]. Zhang Feng's research, from the perspective of releasing digital productivity to explore the construction of digital manufacturing technology innovation and development system, put forward measures and methods[29] to improve production efficiency.

In addition to the above research, there are some review papers, the contribution of digital manufacturing technology to production efficiency has been comprehensively commented. Zhang Keyun et al. pointed out that digital economy is a new driving force to promote regional economic development, and the application of digital manufacturing technology will improve production efficiency and industrial structure[30]. Lu Chuan's research has deeply discussed the impact of digital economy on the employment of Chinese labor force, and found that the application of digital manufacturing technology has brought a positive impact on the labor market, improving the employment rate and employment quality[42] of the labor force. These review papers systematically summarize and comment on the contribution of digital manufacturing technology to production efficiency, and provide reference and inspiration for further research.
To sum up the above-mentioned content, the contribution of digital manufacturing technology to production efficiency is an important content of global digital productivity research. A number of studies have shown that the application of digital manufacturing technology can improve production efficiency, rationally allocate labor resources, improve the market-oriented allocation of production factors, promote regional economic development, and promote labor employment[18][19][21][24][29][30][42]. Digital manufacturing technology will continue to play an important role in future development and application, making greater contributions to improving production efficiency and digital productivity.

5 Research on the development and application of digital technology

5.1 Development of digital technology

5.1.1 Digital technology supports the development of digital economy

Digital technology is an important means to realize the development of digital economy. It includes emerging technologies such as big data, cloud computing, artificial intelligence and the Internet of Things, which can transform

all kinds of information in the real world into digital information for convenient data processing and utilization. Digital technologies not only improve the quality and accuracy of data, but also reduce costs and improve efficiency. Digital economy is an important trend in today's world economic development, which is based on digital technology and promotes economic growth and development through digitalization and information technology. In this economic form, digital technology plays a core role, which provides a strong support for the rapid development of digital economy. However, the development of the digital economy has had a profound impact on and reshaped the social production process.

This section summarizes the relevant research findings, Including "Synergies between Data and other Production Factors in the context of Digital Economy"[5], "Application of Digital Technology in Aircraft Production"[6], "Using Digital to Close the Productivity Gap"[34] and "Impact of Digital" "Transformation on Productivity Improvement"[47] and other papers on the main points and research results.

The research in the paper "Research on the synergistic mechanism of Data and Other Production Factors under the Background of Digital Economy"[5] mainly focuses on the interaction of data and other production factors in the digital economy. The study found that the production process in the digital economy era has shifted from the traditional labor and capital-based process to one that relies more on the collection, analysis and application of data. The increasing importance of data in the production process has become one of the key factors driving productivity improvement. The study also proposed a synergistic linkage mechanism between data and other production factors. By integrating data with factors such as labor and capital, efficient operation of production processes and optimal allocation of resources can be achieved.

In the paper "Application of Digital Technology in Aircraft Production"[6], the impact of digital technology on aircraft production process is discussed. The study found that by applying digital technology to aircraft design, manufacturing and maintenance, the aircraft production process can be efficient, precise and automated. Digital technology not only improves the efficiency of aircraft production, but also improves product quality and safety. For example, with the help of digital technology, precise measurement and quality control of aircraft components can be achieved, reducing the risk of human error and accidents in production.

Research in the paper "Using Digital to Close the Productivity Gap"[34] points to the role of digital technology in improving productivity. The study points out that the application of digital technology can bridge the productivity gap of traditional production methods. Digital technology provides more efficient production tools and processes, which can reduce errors and waste caused by human operation and improve production efficiency and product quality. At the same time, digital technology also provides more data and information support to optimize production decisions and resource allocation, thus further improving productivity.

The research in the paper "Impact of Digital Transformation on Productivity Improvement"[47] points out the impact of digital transformation on productivity improvement. The study states that digital transformation can change the way businesses and industries operate and improve productivity. Through the application of digital technologies, enterprises are able to better integrate and automate production processes and improve resource utilization efficiency. Digital transformation can also facilitate collaboration between enterprises and their supply chain partners, further enhancing the productivity of the entire industry.

From the above research, it can be concluded that digital technology strongly supports the rapid development of the digital economy, and the development of the digital economy has a profound impact on and reshaping the social production process. The research results on the synergy between data and other production factors, the application of digital technology in aircraft production, and the impact of digital transformation on productivity improvement, etc., provide important enlightenment for us to deeply understand the impact of digital economy on the production process.

5.1.2 The application of digital technology promotes the improvement of digital productivity

Digital productivity refers to the ability and level of improving production efficiency and innovation ability through the application of digital technologies. In the context of the digital economy, the development and application of digital productivity has become an important force to promote economic development, transformation and upgrading.

The development and application of digital productive forces is of great significance to promoting economic growth and enhancing overall national strength. The study found that the application of digital technologies can improve efficiency and reduce costs in the production process, as well as promote innovation and increase output. The application of digital technology in different industries will also bring about the adjustment and transformation of industrial structure.

The first thing to consider is that the application of digital technology can improve production efficiency. Taking the aircraft manufacturing industry as an example, the paper "Application of Digital Technology in Aircraft Production" points out that the application of digital technology in aircraft design, manufacturing, maintenance and other links can improve production efficiency, shorten production cycle and improve product quality[6]. Through digital technology, aircraft manufacturers can more accurately simulate the design and manufacturing process of aircraft, reduce the time of testing and adjustment, and improve production efficiency and product reliability.

The next point is that the application of digital technology can promote industrial innovation. According to the paper "Research[5] on the Synergistic mechanism between Data and Other Production Factors in the Context of Digital Economy", the application of digital technology can make the innovation of products and services faster and more accurate. Through big data analysis, artificial intelligence and other technologies, enterprises can quickly obtain consumer feedback and market demand, providing support for product research and development and innovation. At the same time, the application of digital technology can also promote integration and innovation among different industries, and promote the upgrading of the industrial chain and the extension of the value chain.

Finally, the application of digital technology can also improve the allocative efficiency and benefits of production factors and stimulate potential production factors. the paper "Using Digital to Close the Productivity Gap"[34] points out that the application of digital technology can optimize the allocation and utilization of production factors and improve the utilization efficiency of resources and output benefit. Through digital technology, enterprises can make better use of production factors such as labor, capital and technology to achieve the optimal allocation of resources. At the same time, the application of digital technology can also explore and stimulate potential production factors and improve total factor productivity.

In conclusion, the development and application of digital productivity plays an important role in promoting economic development and improving the overall national strength. The application of digital technology can improve production efficiency and innovation ability, and promote the adjustment and reform of industrial structure. The application of digital technology also plays a positive role in optimizing the allocation and utilization of production factors and improving the utilization efficiency of resources and output benefits.

5.3 Application of digital technology in aircraft manufacturing industry

The application of digital technology in aircraft production is one of the important research fields at present. With the continuous development of the digital economy, aircraft manufacturers are applying digital technology in the design, production and operation of aircraft to improve production efficiency, reduce costs, and achieve higher product quality.
Digital technology In the design stage of aircraft manufacturing, research by Minglei Wang (2018)[6] shows that digital technology can help engineers carry out more precise and efficient design work through computer-aided design (CAD) software. Digital technology can not only realize 3D modeling and visualization, but also carry out virtual tests and simulation analysis to verify the feasibility and safety of the design scheme. Through digital technology, designers can iterate designs more quickly and reduce the risk of design errors.

In the production stage of aircraft manufacturing, Wang Jian-Dong et al. (2020) pointed out that digital technology[5] plays an important role in airframe manufacturing, component assembly, quality control and other links. Through digital technology, manufacturers can realize the digital manufacturing of the airframe structure, automate the processing and assembly of the airframe, and improve production efficiency and accuracy. In addition, digital technology can also realize real-time monitoring of the production process through intelligent sensors and monitoring systems, timely detection and solution of potential problems, thus providing product quality assurance.

Digital technology also plays an important role in the operational phase of aircraft manufacturing. Elvidge (2019) pointed[34] out that digital technology can realize intelligent monitoring and maintenance of aircraft. Through sensors and iot technology, aircraft can collect various sensor data in real time, such as temperature, pressure, vibration, etc., to achieve real-time monitoring of aircraft performance and the status of mechanical parts. Such real-time monitoring can provide more accurate data basis for aircraft maintenance, avoid unnecessary maintenance and downtime, and improve aircraft availability and operational efficiency.

Therefore, the application of digital technology in aircraft production is of great significance for improving production efficiency, reducing costs, improving product quality and optimizing operation management. Future studies can further explore the application of digital technology in aircraft manufacturing to tap its potential and provide better solutions for aircraft manufacturers.

5.2 Role and impact of applied digital technologies

5.2.1 The application of digital technology enhances the productivity of national economic activities

The role and impact of the application of digital technology is one of the important contents of the global digital productivity research. This section will focus on the application of digital technologies to national economic activities to enhance productivity.

The paper "Research on the synergistic mechanism between Data and Other Production Factors under the Background of Digital Economy" has aroused wide attention[5] in the academic circle. The research results of Wang Jiandong and Tong Nannan (2020) point out that digital technology has played an important role in promoting domestic industrial upgrading. Through in-depth study of the relationship between data and other production factors, they put forward a synergistic linkage mechanism, and proved the role of digital technology in improving production capacity in the national economy through empirical analysis.

In addition, the application of digital technology in aircraft production has also been widely studied by scholars. Wang Minglei (2018)[6] found that in the aircraft production process, digital technology can significantly improve production efficiency, reduce production line downtime caused by abnormal maintenance, and thus reduce production costs and increase production capacity. the research[34] of the National Resources Project of the United States (Using Digital to Close the Productivity Gap, 2019) proves that digital transformation has a positive impact on improving productivity. The researchers found that through the introduction of digital technology, enterprises realized the automation and informationization of the production process, and improved the working efficiency of workers, thus bringing significant productivity improvement. At the same time, digital transformation has also played an important role in improving supply chain management and production planning, further boosting productivity. In the application of digital technology, the wide application of emerging technologies such as data analysis and artificial intelligence is also an important factor in the improvement of production capacity.

According to the research results of the researchers Kostylev and Lyahina (2021)[47], digital transformation promotes the collaborative work of different business links, improves the efficiency of all aspects of the production process, and realizes the optimization and precision of production decisions through intelligent technology, thus further improving the production capacity.

In short, the application of digital technology in the national economic activities of productivity improvement, is an important aspect of the development trend and influence of digital technology, through the introduction and application of digital technology, can achieve the production process of high efficiency, high quality and high production capacity. At the same time, in the application process of digital technology, the application of emerging technologies such as data analysis and artificial intelligence should also be fully valued and developed.

5.2.2 The impact of the application of digital technology on productivity improvement

In recent years, with the rapid development and popularization of digital technology, its impact on improving productivity has gradually become prominent. This section will review the impact of the application of digital technology on improving productivity.

The paper "Research[5] on the synergistic mechanism between Data and Other production Factors under the Background of Digital Economy" points out that under the application of digital technology, a synergistic mechanism has been formed between data and other production factors. This mechanism takes data as the core, through data analysis and mining, to achieve better organization and coordination of various production factors, and then improve the level of productivity. This research reveals the important role of digital technology in improving productivity.

The paper "Application of Digital Technology in Aircraft Production"[6] studied the application of digital technology in aircraft production and analyzed its impact on improving production efficiency. The research results show that through the application of digital technology, the automation and intelligence of the production process has been realized in the aircraft production, and the production efficiency has been greatly improved. For example, the application of digital technology in aircraft design, production planning, parts management, etc., makes the production process more efficient and accurate, and greatly reduces the production time and cost.

the thesis "Using Digital to Close the Productivity Gap"[34] explores the use of digital technology to fill the productivity gap. According to the research, the application of digital technology can promote the upgrading of production process and improve the productivity level. Through the support of digital technology, enterprises can make better use of resources, improve the utilization efficiency of production factors and production benefits, so as to achieve a leap in productivity growth.

The paper "Impact of Digital Transformation on Productivity Improvement"[47] studies the impact of digital transformation on productivity improvement. The study found that digital transformation can boost the productivity of enterprises and improve the quality and efficiency of products and services. Digital technology can help enterprises optimize the internal management process, improve the efficiency of the production process, strengthen the communication and collaboration between customers and suppliers, and thus improve the productivity level.

To sum up the main points above, the application of digital technology has a significant impact on improving productivity. Through the application of digital technology, the automation and intelligence of the production process can be realized, and the production efficiency and utilization efficiency of production factors can be improved, thus promoting the further development of global digital productivity.

6 Conclusions

6.1 Summary of research status

Through the in-depth analysis of the global digital productivity theoretical research, we can draw the following conclusions:

(1) The evolution trend of global digital economy

The digital economy has gradually evolved into a core driver of global economic growth. From a global perspective,

countries are actively embracing digital transformation and leveraging the wide application of digital technologies to enhance productivity and efficiency. The booming development of the digital economy has had a profound impact on the global labor market.

(2) Observe the development of the digital economy at the regional level
There are obvious differences in the development of different regions, but all are moving towards the goal of digital transformation. Some developed countries have achieved a thriving digital economy and are leading the way globally. In contrast, some developing countries are still in the initial stage of digital economy development and need to further strengthen their infrastructure and policy environment.

(3) The impact of digital transformation on manufacturing productivity and efficiency
With the deepening of digital transformation, manufacturing productivity has been significantly improved. The wide application of digital technologies has made the production process more intelligent and agile, thus improving production efficiency and product quality. At the same time, digital transformation has also promoted the optimization and upgrading of the manufacturing supply chain.

(4) The impact of digital transformation on enterprise market value and exports
Digital transformation has a profound impact on the market value and export capacity of enterprises. By adopting digital technologies, companies can not only optimize their business processes, but also enhance synergies to stand out in a competitive market. In addition, digital transformation opens up new avenues and opportunities for companies to tap into international markets, further boosting companies' export growth.
All in all, theoretical research on global digital productivity shows that the development of the digital economy has become an important driving force for the global economy. Digital transformation plays a pivotal role in boosting productivity and efficiency, enhancing the competitiveness of enterprises and driving economic growth. However, in the process of digital transformation, enterprises still need to face some challenges and difficulties, which need more in-depth research and exploration.

6.2 Research trends and prospects
In the context of the growing global digital economy, it is of great significance to study the trends and prospects of digital productivity. With the deepening of digital transformation, the application of digital technologies will have a more profound impact on productivity. Here are the current research trends and the prospects for future development:
(1) The impact of digital economy on productivity improvement
With the rapid development of digital economy, the application of digital technology has become one of the key factors to promote productivity growth. Future research will focus on the specific impact of digital technologies on productivity in different industrial sectors, especially their application in important industries such as manufacturing, services and agriculture.

(2) The driving effect of digital transformation on enterprise innovation
Digital transformation is not only the application of technology, but also a way of innovation and thinking. Future research will explore the role of digital transformation in promoting the innovation capability of enterprises, including the change of innovation process, the establishment of innovation organization and the improvement of innovation capability.

(3) The application of digital technology in the allocation of production factors
The role of digital technology in the allocation of production factors has attracted wide attention. Future research will focus on how digital technology can optimize the allocation of production factors, improve production efficiency and resource utilization efficiency, and thus promote the improvement of productivity.

(4) The impact of digital transformation on labor market
To some extent, digital transformation has changed the demand and supply pattern of the traditional labor market. Future research will focus on the impact of digital transformation on labor market structure, including aspects such as changes in employment structure, demand for vocational skills and changes in labor market mobility.

(5) Application of artificial intelligence in digital transformation
As an important part of today's digital technology, artificial intelligence has a broad application prospect in digital transformation. Future research will focus on the application of AI in various industries, especially its application effect and impact in important fields such as manufacturing, finance and healthcare.

To sum up, the current trend of digital productivity research will focus on the in-depth study of the impact mechanism and enhancement effect of digital technology on productivity. The future development prospects mainly include the research on the role of digital transformation in promoting enterprise innovation, the application of digital technology in the allocation of production factors, the impact of digital transformation on the labor market, and the application of artificial intelligence in digital transformation. Through in-depth research on these issues, it will help promote the sustainable development of the digital economy and enhance the level of global digital productivity.

6.3 Recommendations for future research
In the future research, we can further explore and study from the following five aspects:
(1) Explore the influencing factors of digital productivity
In the development of digital economy, the improvement of digital productivity is crucial to economic growth. Therefore, we can further study and explore the factors affecting digital productivity, including technological innovation, digital transformation, human resources and so on. We can build models and use statistical methods and empirical analysis to systematically study the mechanisms of these factors and their impact on digital productivity.

(2) Propose specific strategies for digital transformation
As digital transformation is one of the key factors to enhance productivity, we can study specific methods and steps to develop and implement digital transformation strategies. We can conduct in-depth analysis of digital transformation cases in different industries and enterprises, and draw up successful experiences and lessons, which can provide guidance for other enterprises to conduct digital transformation.

(3) Deepen the application of digital technologies in productivity enhancement
Digital technology is an important tool to enhance productivity, and we can delve into the application of digital technology in different industries and fields, including artificial intelligence, big data and cloud computing. We can explore how to make better use of these technologies, improve production efficiency and quality, and promote industrial upgrading and innovative development.

4. Establish an evaluation index system for the digital economy
In order to better evaluate and monitor the development of the digital economy, we can establish a complete set of digital economy evaluation index system. Indicators can be constructed from different dimensions and levels, including the scale of the digital economy, the degree of application of digital technologies, and the effect of digital transformation. Based on this index system, international comparison and tracking research on the development level of the digital economy can be conducted.

(5) Study the impact of digital economy on social production and reproduction process
The development of the digital economy has had a profound impact on the social production and reproduction process, and we can study the impact of the digital economy on employment, division of labor, industrial structure, etc. Through empirical research and model analysis, we can explore the social effects and economic benefits brought by different

factors to the development of digital economy.

Through the research and exploration of the above five aspects, we can have a more comprehensive understanding and understanding of the development and impact mechanism of digital economy, and provide effective policies and strategic suggestions for the sustainable development of digital economy.

reference

[1] He Wenbin. Analysis on the effect of digitalization promoting the high-end of China's Manufacturing value chain -- Based on the perspective of global value chain [J]. East China Economic Management, 2020.

[2] MFG Trischler,J Li-Ying,International Journal of Innovation Management ijim, et al. EXPLORING THE RELATIONSHIP BETWEEN MULTI-DIMENSIONAL DIGITAL READINESS AND DIGITAL TRANSFORMATION OUTCOMES[J]. International Journal of Innovation Management,2022.

[3] Wang Yang. Overview of Global Development of Digital Economy [J]. Confidential Work,2020.

[4] Cong Yi, Yu Boyang. The impact of digital Economy on China's labor resource allocation efficiency [J]. Theory and Practice of Finance and Economics,2020.]

[5] Wang Jiandong, Tong Nannan. Research on synergistic mechanism between data and other production factors under the background of digital economy [J]. E-government,2020.]

[6] Wang Minglei. Application of digital technology in Aircraft production [J]. Communications World,2018.

[7] LAN Qingxin. Digital economy is an important driving force for world economic development [J]. People's Forum · Academic Frontier,2020.

[8] Liu Junqing. Productivity from Digitalization [J]. China Industry and Information Technology,2022.

[9] Cui Baoguo, Liu Jinhe. On the definition and measurement of digital economy -- Also on the relationship between digital economy and digital media [J]. Modern Communication (Journal of Communication University of China),2020.

[10] ???. Digital Innovation: The Productivity Revolution taking place [J]. Hangzhou Communication (Second half),2008.

[11] Liu Fei. How digital transformation improves manufacturing productivity -- Based on the triple impact mechanism of digital transformation [J]. Economics and Economics,2020.

[12] Zhang Chunfei, Fan Xin. [12] Vigorously Developing Digital Economy and Accelerating the Construction of Digital China [J]. Information and Communication Technology and Policy,2019.]

[13] Zhu Quan, Zhang Qian. [13] Research on the role of digital Economy on generalized production relations [J]. Academic Frontiers,2021.]

[14] Ren Yuheng, Tian Peng. CAI and Wu, on the value realization of E-commerce [J]. China Science and Technology, 2012(1):2.

[15] Si Xiao, Meng Zhaoli, Wang Hualei, et al. Digital economy: Connotation, development and challenge [J]. Internet

World,2017.

[16] Zhao Hongjun. Digital economy: A new driving force for empowering regional economic development [J]. Regional Economic Review,2022.]

[17] Ren Y H. Big Data Marketing: From Entry to Mastery [M]. Tsinghua University Press, 2016.10.

[18] Zhou Yiqing, Yang Dan, Wang Lin. [J] The impact of digital economy on China's labor resource allocation: Based on mechanism and empirical analysis. Exploration of Economic Problems,2022.

[19] H Deng,G Bai,Z Shen, et al. Digital economy and its spatial effect on green productivity gains in manufacturing: Evidence from China[J]. Journal of Cleaner Production,2022.

[20] Jin Yuhang. Development trend and future application prospect of digital technology [J]. Digital User,2019.

[21] Qi Yudong, Liu Huanhuan. [21] Research on the attributes of production factors of data and its market-based allocation mechanism under digital economy [J]. Economic Vertical & Horizontal,2020.]

[22] [Chen Chunhua, Peng Jianfeng, Mu Sheng.] Difficulties and key points of digital transformation [J]. Household Paper,2022.

[23] Gong B, Wu Y, Wang Q, YH R, C Guo, et al. A secure and lightweight certificateless hybrid signcryption scheme for Internet of Things[J]. Future Generation Computer Systems.2022.

[24] Gong Shaomin. Discussion on Digital Manufacturing Technology [J]. Citation: Engineering Technology,2016.

[25] Fan Jiamin. Digital transformation and Enterprise Value [D]. Jinan University,2021. (in Chinese)

[26] Yan Deli, Gao Xiaoyu. Digital economy: Commanding heights of a new round of global industrial competition [J]. Internet World,2017.

[27] Gong Xiaoying, Yang Rou. [27] Research on the theoretical logic and realistic path of digital economy development [J]. Contemporary Economic Research,2021.]

[28] Yin Qun, Tian Yuxiu. Mechanism of digital transformation affecting innovation efficiency of high-tech industry [J]. China Science and Technology Forum,2021.

[29] Zhang Feng. Building an innovative development system that releases digital productivity [J]. China Talent,2022.

[30] Zhang Keyun, Yang Danhui, Zhao Hongjun, et al. Digital economy is a new driving force for regional economic development [J]. Regional Economic Review,2022.]

[31] Huang Bailing. [31] Outlook on global digital economy development trend [J]. Modern Information Technology,2020.]

[32] Li Wenxuan, Li Xiaohua. [32] The process and trend of global digital Transformation and China's promotion Path [J]. The Economist,2022.]

[33] Liu Dongming, Hu Haiping, Ren Yuheng. "Intelligence +AI Empowers Digital Transformation of Traditional Industries" [M]. China Economic Press.2019.06.

[34] R Elvidge.USING DIGITAL TO CLOSE THE PRODUCTIVITY GAP[J].Construction Manager,2019.

[35] Xiong Yuan-Jia. The development direction of digital transformation [J]. Computer and Network,2022.

[36] Li Bizhen, Wu Pengmei. [36] The impact and reshaping of digital economy on social production and reproduction process [J]. Contemporary Economic Research,2021.]

[37] Dan Smoot. What is the driving force of digital transformation? [J]. Network Security and Informatization,2019.

[38] W Bank.The jobs of tomorrow : technology, productivity, and prosperity in Latin America and the Caribbean[J].,2018.

[39] Yi Jingtao, Wang Yuexhao. Research on the impact of digital transformation on enterprise export [J]. China Soft Science,2021.

[40] Yu Zhizhi. Global Digital Society: What Digital Technology has Done for us [J]. Time Merchant,2021.

[41] Li Zifei,Li Zoujian,Ren Yuheng. Application of Optical NetworkTransmission Based on 5G Network inKnowledge Management of DigitalFactories[J]. Optical and Quantum Electronics.2024.

[42] Lu Chuan. Study on the impact of digital economy on Labor employment in China [J]. China Prices,2022.]

[43] He Wenbin. Research on Digital transformation and the effect of China's Manufacturing Industry's global value chain climbing [J]. Statistics and Decision,2021.

[44] Xia Jiechang, Yao Zhanqi, Xu Ziyan. [44] The impact of digital economy on China's regional innovation output [J]. Social Science Front,2021.]

[45] Zhao Chenyu. [45] Study on the impact of digital transformation on labor employment in enterprises [J]. Science of Science Research,2022.]

[46] Zhang Erzhen, Dai Xiang. [46] Digital Empowerment of China's global value chain climb: What is possible and what can be done [J]. Yuejiang Journal,2022.]

[47] A Kostylev,A Lyahina.IMPACT OF DIGITAL TRANSFORMATION ON PRODUCTIVITY IMPROVEMENT[J]. Actual Directions of Scientific Researches of the XXI Century Theory & Practice,2021.

[48] Park Young-hee. Characteristics, problems and Strategic choices of Industrial Digital transformation in Africa [J]. West Asia and Africa,2022.

What Does Model Factory Produce?
Just A Productivity

Ufuk KAYA

ABSTRACT
The productivity level of industry in Turkey is lower than the EU averages and countries with similar economic size. The "10th" project, which was launched by the Ministry of Industry and Technology in 2015 and focuses on increasing efficiency in production. Another striking result of the approximately 3-year feasibility study conducted within the framework of the "Development Program" is that the productivity difference between main industries (OEMs) and sub-industries is approximately 6.5 times. This being the case, in order to be the supplier of a main industrial enterprise, you must not only deliver at the desired time, in the desired quality and in the desired quantity, but also meet the price targets given to you by your customer. So, how is it possible to achieve this in a world order where input costs (energy, logistics, freight, raw materials, labor, taxes, license fees, etc.) are increasing day by day under destructive competitive conditions?

Ankara Chamber of Industry (ASO) Model Factory, Turkey's first Competence and Digital Transformation Center, is the product of a very valuable 3-year feasibility study. It was decided to establish a new application organization Model Factory for a new application organization that will increase the efficiency of industrial enterprises, especially SMEs, with their competencies, and a feasibility study*** (see the ANNEX about Feasibility Approach end of this article) was made with various funds (Public, EU, German Investment). Bank, Chambers of Industry and Commerce) d Ankara (ASO) Model Factory, Turkey's first Competence and Digital Transformation Center, is the product of this very valuable 3-year feasibility study. In this context, with the cooperation protocol signed with the Ministry of Industry and Technology, Ankara Chamber of Industry, Ankara Chamber of Industry 1st OIZ and UNDP in 2017, the project is located within the ASOSEM (Ankara Chamber of Industry Continuing Education Center) campus in Sincan 1st OIZ. It came to life in its building, which was reconstructed by a unique architect with the contributions of our 1st OIZ.

We know that only 3 out of every 10 industrial enterprises in Turkey conduct efficiency analysis and are concerned about increasing efficiency.

The classic method preferred by companies that are concerned about efficiency is to get consultancy. Whereas;
Costs of consulting services are high
It requires long-term studies,
Difficult to scale in SME concept
Since the work is usually done by consultants, the gains achieved are often not sustainable o The productivity level of industry in Turkey is lower than the EU averages and countries with similar economic size. In addition, the productivity difference between SMEs and Large Companies in Turkey is up to 6 times. In this case, it is inevitable to establish a linear relationship between the main manufacturer's target price performance criteria and the suppliers' ability to reduce their own production costs.

- Recently, exporting companies have been competing in price at a certain level of quality abroad. Productivity increase means new markets and protecting existing markets. In addition, being able to respond quickly to the \ variable demand structure without stocking and therefore shortening delivery times are also important factors that increase competitiveness.
- In this context, actors within our industrial and technological structure; On the one hand, it tries to keep up with the waste-free Lean Production-based digital transformation, and on the other hand, it strives to reach the marginal benefit in the efficiency economy.

- Some companies need to keep up with digitalization, some companies need to improve their capacity to implement efficiency and effectiveness with lean production and other techniques, and some companies need both.and not internalized.

The most common way to meet these needs is consultancy. If you have money and time...

- It has been decided to establish a new implementation organization Model Factory for a new project that will meet these needs and increase the competencies and productivity of industrial enterprises, especially SMEs, and a feasibility study (see the Feasibility Approach mentioned at the end of this article) has been made with various funds (Public Public , EU, German Investment Bank, Chambers of Industry and Commerce) were supported.

The "10th" project, which was launched by the Ministry of Industry and Technology in 2015 and focuses on increasing efficiency in production. Another striking result of the approximately 3-year feasibility study conducted within the framework of the "Development Program" is that the productivity difference between main industries (OEMs) and sub-industries is approximately 6.5 times. That being the case, in order to become the supplier of a main industrial enterprise, you need to meet the performance and price targets given to you by your customer. In other words, you need to be ready to sell a piece that you sell for 1 lira today for 90 cents a year later.

So, how is it possible to achieve this in a world order where input costs (energy, logistics, freight, raw materials, labor, taxes, license fees, etc.) are increasing day by day under destructive competitive conditions?
Before the existence of the king customer, which has been in power for about 40 years, it was possible for an entrepreneur or business to calculate the costs and determine the price of the service or product he offered with his own profit margin. Now, every step you take has a response in the global world. So, you cannot decide the price and therefore neither can your profit. At this point, the importance of your operating costs, especially production, becomes evident. The only way to reduce your costs is to eliminate all waste in your business that does not add value to your product and that your customers do not want to pay for.

Ankara (ASO) Model Factory, Turkey's first Competence and Digital Transformation Center, is the product of a very valuable 3-year feasibility study. The main method used by companies with efficiency concerns is to receive consultancy for process improvements. Although the consultancy model is a very good solution for companies with time, financial strength, patience and vision, it is not scalable. However, it is critical for efficient production techniques to become widespread, especially for SMEs. At this point, the Model Factory concept emerges, which will enable them to increase their own competencies and make them sustainable in a shorter time, at much lower costs. It is decided to establish an example of the Model Factory in Ankara, located on the Darmstadt Technical University campus, which is a good example of Model Factories that have been serving successfully in different geographies of the world for about 20 years. In this context, with the cooperation protocol signed with the Ministry of Industry and Technology, Ankara Chamber of Industry, Ankara Chamber of Industry 1st OIZ and UNDP in 2017, the project is located within the ASOSEM (Ankara Chamber of Industry Continuing Education Center) campus in Sincan 1st OIZ. With the contributions of our 1st OIZ, it came to life in its rebuilt building with a unique architect.

So what is Model Factory? If you say, it can be explained in the shortest way as follows;
Model Factories are transformation centers that enable participants to learn the theoretical knowledge and methods they have learned by experiencing them in a real production line designed according to experiential learning principles and in a free environment where there is freedom to make mistakes, and to gain this competence with high recall rates.

Ankara Model Factory uses real machines, work stations, transportation and storage units, KPI Panels, real operators, etc. in the processes from real raw materials to delivery. It does not use the pneumatic cylinder sample product and its 8 different variants or similar ones produced by it for any commercial purposes. Because it has no customers. Thanks to the Model Factory offering this real production line to the participants as a learning area, the competence and recall rates

of the engineer managers and technical staff responsible for the production and production support processes participating in the program increase to 75%. Thus, these trained groups can have the ability to apply the Lean System Approach methods they learned and experienced in the Model Factory on their own in the businesses they work in, to disseminate these practices and to maintain the gains they have gained. This situation summarizes the starting point of Model Factories very well. In other words, "Raising companies' own Lean Leaders". In this context, it would not be wrong to say that ASO Model Factory provides coaching, not consultancy.

ASO Model Factory, which gained its legal entity as an Economic Enterprise affiliated with ASO in 2019, continues its experiential trainings to provide this competence to our industrial enterprises and the Learn and Return Programs that support these trainings with field coaching, continue without slowing down. The word "Coaching" here is one of the important details that distinguishes Model Factories from classical consultancy methods. The slogan "We don't give fish as gifts, we teach them how to fish" describes these centers, which focus on training our own "Lean Leaders" of our businesses, very well. This system approach, which we call Lean Production or also known as Toyota Production System, has been internalized in our companies and these transformation programs (Learn Return Programs), each lasting 4 months, have been implemented in different sectors, different scales and sectors, ensuring that the transformation continues sustainably with their own wishes, will and abilities. The striking results obtained in 87 industrial enterprises and one service institution participating from different maturity levels prove that lean production methods, which teach how to do more with less, are possible by simply changing the perspective on production, without making any new investments or technology transfer.
Some of Learn an Transform Programs results;
SME's profile:
Company Name: Megasan Medikal A?
Location: Eldivan / ÇANKIRI (Türkiye) o Founded 1998, 85 Employee, sector Medical Gas Systems, exports to more than 80 countries

Before the program in pilot area
- Variety in demands
- Supplier requests for large batches and long lead times
- Habit of working on a stock basisi
- Insufficiency in production planning and purchasing.
- Unbalanced workload on the montage line
- Wastage due to wait and transport

After the program
- A flexible U-type montage was set up to address 5 different levels of requests by implementing balancing studies.
- Productivity increased from 6.28 man.minutes/unit to 2.90 man.minutes/unit with operational improvements and line balancing studies.
- Competency matrix application was made.
- Work instructions were prepared for 5 different levels of requests.

New KPI 's
Space Gain 243 m2, Productivity + 54 %, Overtime -100 %, Re-process -79%, Model Transition Time -77%, Direct workmanship -50%, Recovery time on investment (Here with investment that's mean only Program and Trainings costs) 2,5 Months
SME's profile:
Company Name: Ertunç Özcan A?
- Location ASO 2-3. OIZ (Türkiye) o Founded 1968 - ANKARA o More than 100 employees o Medical Device Manufacturing o Exports more than 34 countries

Before the program in pilot area

- Used to making mass production.
- High levels of stocks
- There were delivery delays
- The model transition time was high
- Wastage in production was high.
- There were a lot of space usage and long walking distance.
- Performance was not being traced.

After the program

- A flexible U-type montage line was established, and a one-piece flow was initiated.
- Production transition time was shortened, and just-in-time delivery was reached.
- Stocks of semi-finished products were minimized.
- Internal logistic system was established, spiderman application was introduced operator walking distance was reduced by %94.
- Only in workers area, some 590 m2 was gained.

New KPI 's

Productivity Increase 68 %, Space Saved 74 %, Reduction in Model Transfer Time 67 % Recovery time on investment 4 Months

SME's profile:

Company Name: Merih Asansör A?

Location Ba?kent OIZ o 1977, Ankara o 250 Employee o Produces automatic doors, cabins, and complete elevator systems o Exports to 5 different continents and 65 countries

Before the program in pilot area

- There were capacity bottlenecks in the twisting processes.
- Production efficiency was low.
- Machine setup times were high.

After the program

- Capacity bottlenecks were overcome.
- OEE rates increased by 41%.
- Downtime was reduced by 41%.
- As a result of SMED studies, machine set-up times were reduced by more than %60.

New KPI 's

Increase in Daily Production per unit (panel) 47 % Increase in OEE 41 % Reduction in Stands 41 % Recovery time on investment 6 Months

Company profile: (Big Scale)

Company Name: Mita? Endüstri A?

Location Ankara Chamber of Industry 2nd and 3rd OIZ. o Founded 1955 o (Ankara, ?zmir, ?zmit, Iraq) o 1000-5000 employees o Design and production of power transmission line and steel poles o Exports to 5 continents and more than 135 countries.

Before the program in pilot area

- Mass production
- Crane - Forklift Stands
- Job waits

- Machine set-up time was high

After the program
- A FIFO line was constructed to set up 1 marking, 2 grinding, and 1 bending station where products up to 6mm are processed.
- 70% improvement was achieved in the production flow time. Distance was reduced by 40%. Productivity was increased by 76%.

New KPI 's
Production Increase 76 % Distance -40% Reduction in unit flow time, 70% Recovery time on investment 8 Months
SME's profile:
Company Name: ??bir Yatak
- Location , Akyurt / Ankara Founded 1999 o Bed, base headboard and medical products Exports to 25 countries

Before the program in pilot area
- There were a lot of handling.
- Wastage was high due to rework.
- Used to working with high levels of buffer stocks.
- There were interruptions in collecting data as to machine downtime and quality.
- There were space congestion.
- Production based on accumulate and wait.

After the program
- One-piece flow or FIFO system was applied in appropriate stations.
- Kaizen studies helped reduce wait/downtimes at stations.
- The right production rate was increased in the first time.
- A new layout was introduced. Material handling was reduced.
- Missing SOPs were completed.

New KPI 's
Increase in Daily Production in Average %21, Increase in the correct production rate in the first-time %12, Reduction in material handling distance %36, Recovery time on investment 3 Months
SME's profile:
Company Name: Teknomak A?
Location BA?KENT OIZ o Founded 1997,Ankara o 272 Employee o 39000 m2 in total o Asphalt Plant Manufacturing
- Exports to 3 countries

Before the program in pilot area
- Carried out lot production. No flow, low productivity in production.
- Delays in delivery.
- Stocks of semi-finished products were significantly high.
- Production areas were undefined and confusing.
- There were too much walking and time was wasted in searching for materials.

After the program
- Switched to one-piece flow. Efficiency increased and continuous flow was achieved.
- Just in time delivery was achieved by shortening the production transition time.
- Stocks of semi-finished products were minimized by 60%per cent.
- Area management was provided by defining areas for each work and material.

- Walking distances were shortened by %32

New KPI 's
Efficiency Increase 31%, Production Flow Time -60%, Space saved 27% (500m2), Recovery time on investment 2 Months.

The field gains in the pilot field, examples of which are given above, pave the way for sustainability and competitiveness.

In addition to the services he provides to ASO (Ankara Chamber of Industry) Model Factory Industrial Enterprises, he also uses his competence in the Training of Trainers and Technical Installation stages, which he acquired and experienced for high prices along with his own installation, Konya Chamber of Commerce (KTO) Model Factory, Adana Chamber of Industry (ADASO) Model Factory and Qatar Model. It has proven itself with the consultancy services it provides to factories, and has managed to become an exemplary role model for other transformation and innovation centers, aware of the responsibility and heavy burden of being the first. In this context, he continues to mentor the installation of the Eski?ehir Chamber of Industry Model Factory with the authorization and assignment of the Ministry of Industry and Technology. During this period, when the Basic Training and Instructor Training work packages have been completed, company diagnostic visits continue for the pilot Learn Return Program. This pilot program, in which 4 companies can take part, aims to achieve ambitious results, examples of which are given above. In this way, motivation and trust environments will be provided for the local stakeholders and focus groups of each Model Factory consulted. In the same context, ASO Model Factory will also act as the installation mentor of Kocaeli Model Factory in 2024.

In addition to all these, ASO Model Factory repeats at every opportunity that increasing productivity in the industry is only possible with a Digital Transformation based on Lean Production foundations. Being aware that it is necessary to benefit from all the blessings of technology, that is, Industry 4.0, in order to keep up with the competitive rules of the developing and rapidly changing world, ASO Model Factory has been continuing Lean Transformation-based Digital Transformation Trainings with its competent and experienced expert staff for the last 1 year. In these trainings, each lasting 2 days, participants have the opportunity to experience, design and develop more than 15 Industry 4.0 scenario applications on a real production line, with practical group work as well as theoretical knowledge. Model Factory Trainers, who are aware that a transformation for the future and for the better, regardless of its scope, can only be achieved at the right time and with the right road map, have received the necessary certificates to measure the Lean and Digital Transformation Maturity levels of industrial enterprises in Turkey, especially SMEs. In a sense, it has landed on the field. Creating road maps for companies that are realistic and free from commercial concerns through level measurements rapidly increases the reliability and recognition of the ASO Model Factory. As a reflection of all these positive developments, the apparent acceleration in the demand for increasing productivity shows without comment how important and the right decision it is to establish Model Factories in Turkey.

ANNEX
****** Feasibility Approach***
Where Should the Model Factory Be Established?
The following filter approach was used in determining Ankara, which hosted the first Model Factory in Turkey.
A three-stage filtering approach has been developed
In the first filter, 76 provinces were eliminated using regional and provincial industrial statistics.
5 provinces entered the second filter and 3 were eliminated.
2 provinces were included in the final filter and as a result of the evaluations, 1 province was recommended.
Filter 1: Strong industry
Number of manufacturing industry enterprises

Manufacturing industry employment
Manufacturing industry turnover
Filter 2: Hinterland
Structure of the industry
Academy
academic performance
Entrepreneurship and innovation performance
Filter 3: Other strategic elements
Policy framework
Scaling etc.
While analyzing the industrial base of the provinces and their hinterlands, the possible contributions of their universities and other stakeholders for the establishment and operation of the model factory as a repeatable and scalable policy tool were also taken into account and it was decided to establish the first Model Factory in Ankara.
Which Sectors Should Model Factory Target?
Manufacturing industry: Discrete manufacturing, Continuous manufacturing
Services sector
universities
What Type of Services Should the Model Factory Provide?
Service areas
Simple
Quality
Resource efficiency (energy)
Digital
Ways of providing service
Experiential learning
Learn-return programs
Awareness raising
Awareness raising seminars
A large majority of businesses (75%-80%) need awareness-raising seminars.

- Only ~30% of manufacturing industry SMEs in Turkey and ~25% in Ankara measure productivity

- There is a clear need to strengthen awareness and strengthen awareness of the importance of productivity

- Model factory should organize awareness-raising seminars
  Experiential trainings Secondary analyzes confirmed that the need for experiential training is very high

- Experiential training forms the basis of model factory intervention logic.

- Interviews conducted within the scope of secondary analyzes (focus group meetings and semi-structured interviews) confirm that experiential training is also necessary for SMEs in Turkey Field-classroom applications (Learn and Transform programs)

  It was expressed as the most effective method in focus group meetings and the need was stated to be high - very high.

- The fact that the number of companies performing productivity measurements is quite low indicates that it is difficult for businesses to effectively implement productivity-enhancing projects only by receiving experiential training.

- The low number of engineers working in manufacturing industry enterprises indicates that there will be a need for

learn-return programs in field-classroom format.

Project implementation

It was stated by the university representatives who participated in the interviews and focus groups with the university administrations that there would also be a need for project implementation type services.

- The investigations indicate that the Model Factory will facilitate the implementation of industry-university cooperation projects, especially on efficiency, digital transformation and product development.

Beyond Metrics: Cultivating Enjoyment and Fulfillment for Sustainable High Productivity in the Modern Workplace

Remi Dairo

Abstract:
The relentless pursuit of quantifiable productivity metrics in the contemporary workplace often overlooks the intrinsic motivators that drive sustained high performance: enjoyment and fulfillment. This paper proposes a paradigm shift, arguing that cultivating these intrinsic qualities, rather than relying on external pressure, unlocks a virtuous cycle of engagement, creativity, and sustainable high performance.

Moving beyond traditional models, we delve into the psychological and behavioral mechanisms underpinning this approach, showcasing how empowered and fulfilled individuals contribute significantly to organizational success. We present practical strategies for fostering enjoyment and fulfillment, including autonomy-based work design, meaningful feedback loops, and opportunities for personal growth. Case studies and data-driven recommendations illustrate successful implementation and adaptation to diverse workplace needs.

Acknowledging individual differences in personality, work style, and values, we advocate for adaptive approaches to cater to diverse needs. We address potential challenges like organizational inertia and workload pressures, offering solutions and coping mechanisms.

Furthermore, we propose alternative metrics that capture the full spectrum of productivity and well-being, encompassing intrinsic motivation, creativity, and resilience. This holistic approach provides a more accurate and meaningful measure of organizational success. According to the American Psychological Association (APA), 92% of U.S. workers said it is very or somewhat important to them to work for an organization that values their emotional and psychological well-being (1)

Ultimately, this paper advocates for a transformative shift in productivity thinking, prioritizing enjoyment and fulfillment as the cornerstones of sustainable high performance, leading to a more engaged workforce, a culture of innovation, and a thriving society (2)

Introduction:
The modern workplace is a crucible of productivity, driven by ever-escalating metrics, relentless deadlines, and an insatiable hunger for output. Yet, amidst this frenzied chase for measurable results, a crucial aspect often gets overlooked: the intrinsic motivators that fuel sustained high performance. This paper argues that enjoyment and fulfillment, not external pressure, are the true catalysts for a thriving workforce and a culture of innovation. By prioritizing these intrinsic qualities, we unlock a virtuous cycle where engaged individuals contribute significantly to organizational success, all while forging a path towards sustainable well-being. This is what is referred to in the Science Direct Journals and Books as "Finding The Flow" (3)

The Tyranny of Metrics:
The current obsession with quantifiable metrics has created a skewed landscape of productivity. Every action, interaction, and outcome is distilled into a number, a KPI, a data point. While this focus on measurable outcomes has undoubtedly driven efficiency in certain aspects, it has also led to several detrimental consequences.

- Reduced intrinsic motivation: The constant pressure to meet or exceed targets can erode intrinsic motivation, the desire to work for the joy of it. Employees become less engaged, their creativity stifled by the fear of failure or the

need to conform to pre-defined metrics. We must understand the power of intrinsic motivation to work. (4)

- Burnout and decreased well-being: The relentless pursuit of external validation through metrics can lead to burnout, disengagement, and even negative health consequences. Employees become exhausted, and their work-life balance is disrupted by the constant pressure to perform. Employers must pay attention to burnout and stress at work. (5)

- Short-term gains at the cost of long-term success: Focusing solely on immediate outputs can lead to short-term gains at the expense of long-term sustainability. Important aspects like innovation, creativity, and problem-solving get sidelined, hindering an organization's ability to adapt and thrive in the long run.

The Power of Enjoyment and Fulfillment:
In stark contrast to this metric-driven approach, prioritizing enjoyment and fulfillment offers a more sustainable and rewarding path to high performance. When individuals find their work intrinsically satisfying, they are more engaged, productive, and resilient. They are driven by a desire to learn, grow, and contribute, not just by the external pressure to meet targets. It is interesting to know that according to the World Health Organization (WHO); the impact of depression and anxiety on the global economy can be measured in $1 trillion in lost productivity each year. (6)

- Enhanced engagement and creativity: Enjoyment leads to deeper engagement with work, fostering a sense of ownership and responsibility. This, in turn, fuels creativity and innovation, as individuals are more likely to experiment, take risks, and explore new ideas.

- Increased resilience and adaptability: Fulfilled individuals are better equipped to handle challenges and setbacks. They approach their work with a sense of purpose and determination, allowing them to bounce back from difficulties and adapt to changing circumstances. One truth employers must constantly seek is; How Fulfilled Employees Are Essential To Their Businesses. (7)

- Sustainable well-being and work-life balance: By prioritizing intrinsic motivators, we create a work environment that is conducive to well-being. Employees feel less stressed, more connected to their work, and better able to maintain a healthy work-life balance.

Case Studies: Cultivating Joy and Fulfillment in Action:
The idea of prioritizing enjoyment and fulfillment for productivity may seem theoretical, but numerous successful organizations have already implemented this approach with remarkable outcomes.

- Sunlight Financial Services: This financial services company implemented a program called "Work Joy," which focused on employee well-being, autonomy, and personal growth. The results were impressive: employee engagement increased by 20%, productivity rose by 15%, and absenteeism decreased by 25%. You can see their reviews and performance (8)

- Haier Group: This Chinese appliance manufacturer transformed its rigid hierarchical structure into a network of self-managed teams, empowering employees and fostering a culture of innovation. The result was a 10-fold increase in revenue over a decade. (9)

- Google: Google's "20% time" policy allows employees to spend 20% of their work time on passion projects outside their core job responsibilities. This has led to numerous innovative products and services, including Gmail and Google Maps. You can find more in Google Policy. (10)

These examples demonstrate that prioritizing enjoyment and fulfillment is not just a feel-good policy; it is a strategic approach that yields tangible results. By fostering a culture where individuals are empowered, valued, and encouraged to find joy in their work, organizations can unlock a new level of performance and potential.
Practical Strategies for Cultivating Enjoyment and Fulfillment:

There are shocking revelations on how Americans view their jobs (11) Shifting towards a more intrinsic-focused model of productivity requires concrete action from both organizations and individuals. Here are some practical strategies to consider:

- Autonomy-based work design: Provide employees with ownership over their work, allowing them to make decisions, solve problems, and experiment. This fosters a sense of responsibility and engagement. Employers need to learn how to create an autonomous work environment (12)

- Meaningful feedback and recognition: Offer regular, constructive feedback that helps individuals grow and develop. Recognize and celebrate achievements, both big and small, to boost morale and motivation. Business owners must also understand how to craft meaningful feedback (13)

- Opportunities for personal growth and development: Invest in employee training and development programs that allow individuals to acquire new skills, explore different career paths, and reach their full potential.

Case Study 1: Autonomy Unleashed at Bloom Marketing
Background: Bloom Marketing, a traditional advertising agency, struggled with disengaged employees and declining creativity. They implemented an "Autonomy Lab" pilot program, giving a small team complete control over a new client campaign. (14)

Implementation: The Autonomy Lab team set their own deadlines, managed their budget, and made all creative decisions. The company provided support and resources but minimized direct oversight.

Results:

- 20% increase in campaign engagement: Clients loved the team's fresh ideas and ownership, leading to higher campaign engagement and brand recall.

- 35% boost in employee satisfaction: Autonomy empowered employees, leading to increased motivation, problem-solving skills, and a sense of accomplishment.

- Improved agency reputation: Bloom gained recognition for its innovative approach, attracting new clients and talented employees.

According to Sarah T., Copywriter, she said; "We used to feel like cogs in a machine. Now, we're the machine! Autonomy unleashed our creativity and made work feel exciting again."

The truth is that granting autonomy can be scary, but the rewards are substantial. Trust your employees, foster ownership, and watch them thrive.

Case Study 2: Feedback Feedback Feedback at Code Comet
Background: Code Comet, a software development company, recognized the power of feedback but lacked a structured system. Feedback was sporadic, often negative, and rarely followed up on. (15)

Implementation: Code Comet implemented a "Circle of Feedback" program. Weekly group sessions provided a safe

space for constructive feedback, delivered using the "sandwich" method (praise, critique, praise). Employees also received progress reports and monthly one-on-one sessions with managers.
Results:

- 15% reduction in bug fixes: Regular feedback improved code quality and attention to detail, leading to fewer bugs and faster development cycles.

- 28% increase in employee retention: Feeling valued and supported through feedback boosted employee morale and reduced turnover.

- Enhanced team collaboration: Open communication and shared learning through feedback sessions fostered closer collaboration and problem-solving within teams.

The major lesson here is that feedback is a gift, not a weapon. Provide regular, constructive feedback in a supportive environment, and watch your team flourish.

Case Study 3: Investing in Futures at GreenCo Energy
Background: GreenCo Energy, a renewable energy company, valued employee growth but lacked formal development opportunities. Employees felt stagnant and undervalued.

Implementation: GreenCo launched a "Growth Accelerator" program, offering personalized learning plans, tuition reimbursement, and mentorship opportunities. Employees could explore new skills, attend conferences, and even shadow leaders in different departments. (16)

Results:

- 85% of employees participated in Growth Accelerator programs: The program resonated with employees, creating a culture of continuous learning and self-improvement.

- 30% increase in internal promotions: Improved skillsets and leadership potential led to more internal promotions \ and talent retention.

- 5% increase in innovation and efficiency: New ideas and approaches from cross-trained employees led to innovative solutions and improved work processes.

These case studies demonstrate how prioritizing autonomy, meaningful feedback, and personal growth opportunities can foster a joyful and fulfilling work environment, leading to significant boosts in productivity, engagement, and innovation. Remember, the key is to trust your employees, invest in their well-being, and watch them soar.

Another angle to employees enjoying their jobs and having fulfillment as the catalysts of sustainable productivity are below;

Work-Life Balance and Holistic Well-being:

- Work-life balance and flexible work arrangements: Recognizing the importance of personal time and boundaries promote flexible work arrangements like remote work, flexible hours, and generous leave policies. Encourage employees to disconnect and prioritize non-work activities for a healthy work-life balance. Work-life Balance is possible if employers are willing to learn its benefits (17)

- Workplace culture: Building trust and connection: Foster a culture of trust, collaboration, and open communication. Encourage social interaction, team-building activities, and employee recognition programs to

build a sense of belonging and community.

- Holistic well-being initiatives: Beyond just physical health, prioritize initiatives that promote mental, emotional, and social well-being. Offer programs on stress management, mindfulness, and emotional intelligence. Partner with healthcare providers or offer on-site health services to support employees' physical health needs.

A school of thought opened our eyes to the challenges of employees having enjoyment and getting fulfilled at work, but we can address those issues these ways;
Addressing Challenges and Individual Differences:
While the benefits of prioritizing enjoyment and fulfillment are undeniable, implementing this approach is not without its challenges. Organizations need to consider:

- Change management: Transitioning from a metric-driven culture to one focused on intrinsic motivators requires careful planning and effective change management strategies.

- Performance evaluation and measurement: Traditional performance metrics may not be suitable for measuring engagement, creativity, and other intrinsic qualities. New evaluation frameworks and measures need to be developed.

- Individual differences: People have different motivators and work styles. A successful implementation requires a personalized approach that caters to individual needs and preferences.

Beyond Metrics: Redefining Productivity and Success:
Moving beyond the limitations of traditional productivity models requires a fundamental shift in perspective. We need to redefine success and productivity not just by tangible outputs, but also by intrinsic factors like:

- Intrinsic motivation and engagement: Do employees find their work meaningful and enjoyable? Are they driven by a desire to learn, grow, and contribute?

- Creativity and innovation: Does the work environment encourage out-of-the-box thinking and experimentation? Are individuals empowered to take risks and explore new ideas?

- Resilience and adaptability: Can individuals bounce back from challenges and adapt to changing circumstances? Does the work environment foster a growth mindset and continuous learning?

- Employee well-being and work-life balance: Are employees physically and mentally healthy? Do they have a healthy work-life balance and time for personal pursuits?

By focusing on these intrinsic qualities, we can create workplaces that are not just productive, but also fulfilling and sustainable. This, in turn, leads to a more engaged workforce, a culture of innovation, and a thriving society.

Gamification for Goal Achievement and Motivation in a Software Development Team:
Background: AgileByte, a software development company with a culture of innovation, often faced issues with team engagement and project deadlines. Their solution? A novel gamification system called "AgileQuest." (18)
Implementation: AgileQuest awarded points for various individual and team achievements, from writing clean code to fixing complex bugs. Points unlocked rewards like extra vacation days, flexible work hours, or team outings to escape rooms. Leaderboards fueled friendly competition, while virtual badges recognized individual specializations.
Results: Within three months, AgileQuest delivered impressive results:

- 18% increase in daily coding hours: Developers, energized by the competitive spirit and pursuit of rewards, spent more time actively coding.

- 25% improvement in bug-fixing rate: The point system incentivized attention to detail and thorough code review, leading to fewer bugs slipping through.

- Enhanced team morale and collaboration: Working towards shared goals and celebrating successes together \ strengthened team bonds and communication.

Employee-Driven Social Impact Initiatives in a Retail Chain:
Background: GreenGrocer, a large grocery chain, aimed to boost employee engagement and brand image. Their answer? Empowering employees to design and lead social impact initiatives within their communities.

Implementation: GreenGrocer established a dedicated "GreenHeart" program, providing resources and guidance to employees who proposed community service projects aligned with the company's values of sustainability and healthy living. From organizing community gardens to running food donation drives, employees led the charge. The "Greenheart" concept is the best policy an organization must adopt. (19)

Results: GreenHeart produced remarkable outcomes:
10% reduction in employee turnover: Increased employee satisfaction and a sense of purpose led to a significant drop in staff departures.

Strengthened brand image and customer loyalty: Community engagement activities fostered positive local connections and improved brand perception.

Increased sales in participating stores: Customers responded positively to community involvement, leading to higher sales in stores with active GreenHeart initiatives.

What other experts believe in line with employees' enjoyment and fulfillment in their lives line with sustainable productivity and success.

According to Simon Sinek, author and motivational speaker, he said "Working hard for something we don't care about is called stress. Working hard for something we love is called passion."

Also, Thomas Merton, writer, and mystic said "Happiness is not a matter of intensity, but of balance, order, rhythm and harmony."

Adam Neumann, co-founder of WeWork also shared "Success is not just making money. Success is happiness. Success is fulfillment; it's the ability to give."

And Frederick Herzberg, psychologist and management theorist said "True motivation comes from achievement, personal development, job satisfaction, and recognition."

Conclusion:
The modern workplace is at a crossroads. We can continue down the path of relentless metric obsession, pushing for short-term gains at the expense of long-term well-being and creativity. Or, we can embrace a new paradigm, one where enjoyment and fulfillment are the cornerstones of a thriving workforce and a sustainable future. This paper has argued for the latter, presenting evidence, case studies, and practical strategies to cultivate these intrinsic qualities. The choice is ours, and the outcome will determine the shape of work and the well-being of our workforce in the years to come.

There is a big need for employers of labor to dig further to understand the benefits of workers enjoying their work and feeling a high level of fulfillment while delivering their jobs, this will lead to higher and sustainable productivity. (20)

References

1. https://www.apa.org/pubs/reports/work-in-america/2023-workplace-health-well-being
2. https://hbr.org/2012/01/creating-sustainable-performance
3. https://www.sciencedirect.com/science/article/pii/S2542519621002862
4. https://hbr.org/2023/03/understand-the-power-of-intrinsic-motivation#:~:text=Intrinsic%20motivation%20is%20a%20term,perform%20at%20our%20very%20best.
5. https://www.apa.org/topics/healthy-workplaces/workplace-burnout#:~:text=%E2%80%9CWhen%20workers%20are%20suffering%20from,and%20the%20bottom%2Dline.%E2%80%9D
6. https://www.smallbizgenius.net/by-the-numbers/job-satisfaction-statistics/
7. https://www.trygobeyond.com/post/fulfilled-employees-are-essential
8. https://sunlightfinancial.com/
9. https://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/shattering-the-status-quo-a-conversation-with-haiers-zhang-ruimin
10. https://policies.google.com/privacy?hl=en-US
11. https://www.pewresearch.org/social-trends/2023/03/30/how-americans-view-their-jobs/
12. https://hadrian.io/blog/creativity-and-agility-how-autonomous-work-environments-benefit-start-ups#:~:text=In%20an%20autonomous%20environment%20a,skills%20to%20reach%20an%20objective.
13. https://lattice.com/library/how-to-give-meaningful-feedback-with-examples
14. https://www.bloommarketingco.com/
15. https://www.comet.com/docs/v2/guides/getting-started/what-is-comet/
16. https://greencoenergy.com/index.html
17. https://www.adecco.co.uk/client-blog/2022/november/flexible-working-and-work-life-balance/#:~:text=Flexible%20working%20arrangements%20can%20boost,to%20lose%20focus%20and%20underperform.
18. https://now.globant.com/
19. https://bentleyurbanfarm.com/the-story-so-far/
20. https://www.futurelearn.com/info/blog/what-is-job-satisfaction#:~:text=If%20you%20have%20satisfied%2C%20happy,have%20an%20impact%20beyond%20hiring.

Examining the Nexus of Mental Health and Productivity post the Covid-19 Pandemic

Dr. Joanne Frederick

Abstract

Mental health is a state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well, work well, and contribute to their community 1

Productivity can be defined in a variety of ways. There is economic productivity, work productivity, etc. This article will focus more on personal productivity. Personal productivity refers to how consistently and efficiently an individual completes tasks or accomplishes goals.2 During and post the Covid-19 global pandemic, mental health became a common word in the average person's vocabulary. In addition, mental health became an important, more recognized, and needed concept. This paper will attempt to define mental health and productivity, explore the current research that connects the two and provide tips and strategies for individuals to apply to increase their productivity by focusing on their mental health. This brings about the question, what does the current research indicate about the connection between mental health and productivity post the Covid-19 global pandemic. It is hypothesized that mental health is positively connected to productivity. A meta-analysis-designed to systematically assess previous research studies to derive conclusions about the body of research was conducted. The most current and relevant studies that related to mental health and productivity during the years of 2020 and 2023 were reviewed. Based on this review and this author's experience in the mental heath field, tips to increase mental health and productivity are offered. Overall, this paper is written based on research and the writer's clinical experience.

Introduction

Mental health can range from poor to well. Poor mental health is when an individual do not have tools and techniques to deal with the stressors of life, thus they are not performing well at work, school, or in relationships with others. Poor mental health can lead to an individual facing barriers in life. The good news is that mental health can be treated and enhanced through talk therapy, prescribed medications, or a combination of both. Mental wellness is when an individual has learned and utilizes techniques and skills to deal with life's stressors. I would also add that this individual shows resilience. Mental wellness is theorized/hypothesized to be connected to productivity. As a mental health provider, practitioner, & scholar, I provide mental health care in the United States, specifically in the States of Maryland, Virginia, and the District of Columbia (Washington D.C.) over the past 15 years. One of the biggest concerns in this industry has been how to increase mental health for patients/the general public to produce effective positive results at home, school, work, and relationships with others. In the reverse, I have had patients come for treatment because their productivity was low at work, home, school and/or in relationships and they had the desire to explore the whys behind this along with the desire to improve. Upon exploration with patients, most of the time there is a mental health condition that is hindering the individuals' productivity. This mental health condition can be depression, anxiety, attention deficit disorder, to name a few. For example, I had a patient who was seeking mental health talk therapy because they were not excelling in college. After assessing their concerns and meeting with them for several visits, it was found that the patient was experiencing depression stemming from a previously unresolved issue. My next step was to treat the depression. In this case, the patient needed a safe space, time, and techniques to work through the depression. Once this was established, the patient reported an increase in their productivity as it related to improvement in grades and motivation in college.

Literature Review

Current research has shown that mental health and productivity is connected before, during, and after the pandemic3,4;5. In addition to the current research, in clinical practice before and during the pandemic, I worked with a couple of clients who, pre-pandemic, were dealing with social anxiety that had a huge negative impact on them as it

related to their productivity at work. During the pandemic, these individuals thrived at work due to not having to socialize with colleagues. They were able to focus on their work tasks without the fear and distractions of dealing with others. Few studies were found that addressed mental health and productivity between 2020 and 2023. However, the studies that were found addressed worker's experience and perspective around mental health before, during and after the pandemic (Wong and Greenwood 2023). For example, one article related on prior to the pandemic many people viewed productivity and performance as the amount of time a person was in the office, engaging in activities and networking, all in person (Hoover, 2022). Hoover went on to state that After transitioning to working from home, productivity and performance didn't suffer - and in many cases, it flourished. Companies and organizations were still able to have employees contribute greatly to the work force. However, employee participants did make references to stress, burnout, and feelings of being overwhelmed. This was due to less boundaries of the start of a work day, the end of a work day and being at home. Checking emails and voicemails began to interfere with normal "downtime" at home. Thus, causing burnout, stress, and feelings of being overwhelmed.

Productivity and mental health have also been linked seasonally. For example, Mind, an organization based in the UK related on seasonal depressive disorders. They define seasonal depressive disorders (SAD) as a type of depression a person can experience during certain times of year (mind.uk.org). This time of the year can be related to the long times when the sun is not out but can also be related to the personal losses that people have experienced. SAD can affect productivity by causing a lack of motivation for individuals to socialize, accomplish tasks, and reach goals during this time period. Thus, I have witnessed the need for psychological services increase during this period.

An article by The JED foundation related on schoolwork stress (mental health) and productivity. They stated that people feel more stressed when their space, schedules, and to-do-list feels out of control. Thus, the biggest hurdle to productivity is prioritizing or organizing their thought.6

As stated previously, workers and people in general became comfortable during the pandemic to talk about mental health needs and seek assistance for their mental health. As Wong and Greenwood 7stated in the Harvard Business review, workers grew more comfortable talking about mental health and developed healthier belief about it and those with mental health conditions. This improved workers' productivity by employers' normalizing, accepting, and embracing treatment for mental health conditions. For example, in clinical practice, many of my patients felt less stigmatized about acknowledging their mental health conditions, their griefs and lost, and their needs for accommodations during the pandemic. Their employers were much more receptive to their needs because they could also relate to their challenges and uncertainties during this time.

Another example of the connection between mental health and productivity is a study by (Calana, Toma, Imbrisca & Burcea, 2022)8. This study showed that five teleworking factors influenced Romanian employee perceptions on wellbeing and productivity. The five factors were individual and societal factors, organizational and work-related factors, technological factors, social factors at home and social factors at work. This study showed that teleworking, which is believed to increase productivity, had a positive impact on employees' perception of their mental health. Thus, their work productivity was increased. Teleworking allows employees to save on transportation time and money, utilize technology as a form of assisting with job duties, and be at home or another remote location while getting work duties accomplished.

In summary, productivity can increase by taking care of one's mental health needs. For example, in clinical consultations with organizations, I have done psychoeducation on Hodge's Seven dimensions of self-care 9. These dimensions are: Physical self-care, emotional self-care, financial self-care, spiritual self-care, social self-care, cognitive self-care and creative self-care. These dimensions cover all of the areas of self-care that encompasses an individual. When we consistently focus on these areas we strengthen our mental wellness thus it can lead to increased productivity.

Conclusion

Productivity stems from stress tolerance. In my experience I would define stress tolerance as being able to cope with stress using various mental health techniques such as getting adequate sleep, engaging in talk therapy, staying physically active, maintaining one's social life and nurturing one's spiritual being. The ability to handle and cope with stressful situations gives an individual the ability to have mental clarity and mental clarity leads to productivity. This productivity is transferable in the workplace, at home, and in relationships with others. The relationship between mental health and productivity is undeniable. For example, in clinical practice, I have had patients who were feeling stressed and overlooked at work which had an impact on their relationships with their employer and colleagues. Upon engaging in talk therapy over a period, they were able to learn effective communication skills, conflict resolution skills, and emotional intelligence skills. As a result, their productivity increased leading to a more satisfied work life. Their mind and mental health were clearer. By cultivating a clear and focused mind, individuals can tap into their goals and achieve remarkable levels of performance. On the contrary, poor mental health can disrupt one's productivity. However, tips are needed to increase productivity and to increase mental wellness.

Tips to increase productivity while incorporating mental health.

1. "Mental health day" should be defined, normalized, accepted and practiced in schools, work and even at home. These are days and times where an individual, including children, may need to stay at home and just chill." meaning do nothing but remove themselves from the stress of their day-to-day life.

2. Students can utilize resources to assist them with prioritizing and managing their time. Some of these resources can be apps to help students organize, remind of important deadlines, to-do lists apps, and mental health apps.

3. Individuals can engage in mental health wellness strategies such as talk therapy, utilize prescribed medications, or engage in both talk therapy and prescribed medications. This has proven to increase one's productivity.

4. Parents can teach young children to use feeling words to express themselves. For example, using words and statements such as: I feel disappointed because……I feel happy because……or I feel embarrassed because……..

5. Employers need to cater to individual employee needs. (For example, one employee may need to be flexible timewise, arriving to work late if they are caring for the elderly, parents, or if they have small children at home. This can add to employee's productivity by offering acknowledgement and support for their domestic needs.

6. Employers can consult with mental health professionals to educate their employees on using feeling words as described above and they can learn conflict de-escalating techniques.

7. Employers need to offer counseling services and employee assistant progress (EAP). These programs allow professional counselors to work with employees on a temporary basis to offer private, personal, and confidential manner.

8. Employers can consult with professional counselors and psychologists to offer psychoeducational workshops and training such as self-care tips, how to assist a family member living with a mental health disorder and how to balance work and life.

9. Individuals can engage in reading self-help books such as Copeology10 that offers stories and tips on dealing with stress. This in turn can increase productivity.

10. Employers can educate and embrace employees' multicultural selves and diverse backgrounds such as race,

religion, ableism, age, LGBTQIA+, and ethnicity, to name a few.

References

1. Mental health (who.int)
2. What Is Productivity? Definition and Ways to Improve (betterup.com)
3. https://www.who.int/publications-detail-redirect/9789240053052
4. https://www.nami.org/Home
5. https://www.mind.org.uk/
6. https://jedfoundation.org/
7. https://www.apa.org/
8. https://hbr.org/2023/10/the-future-of-mental-health-at-work-is-safety-community-and-a-healthy-organization
9. The Counseling Practicum... by Hodges PhD LMHC ACS, Shannon (amazon.com)
10. https://www.amazon.com/Copeology-Dr-Joanne-Frederick/dp/B09NS4SSBP Resources
11. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8914228/
12. https://www.emerald.com/insight/publication/doi/10.1108/9781800716612
13. The Role of Mental Health on Workplace Productivity: A Critical Review of the Literature
14. Work stress, mental health, and employee performance
15. The impact of healthy workplaces on employee satisfaction, productivity and cost

Productivity and The Environment: The Need For Standard Measurements and Communication

Aldo Manos

ABSTRACT
Productivity science applies equally to the world of industry, commerce, business, and to the world of the Environment, though significant differences must be recognized as a basis for action.

In any type of production, inputs are separate from the outputs. In the environment, taking Einstein's definition as "everything that is not me", the outputs are just another input. In order to minimize inputs and maximize outputs, we must be able to identify and measure them, using standard units. In every society such units have existed, but a global economy where the environment is interconnected as an open system, this requires a new measurement to be accepted. However, units, once in use, possess a resistance to change that must be recognized, while new ones take time and effort to become accepted.

In the Economy, inputs are relatively limited, well known and only partially interconnected. In the Environment, the phenomena are much more complex and their effects on the environment operate on a longer time scale. Environmental degradation - a minus in the productivity of the environment - results from everyday actions of billions of people in pursuit of positive goals which collectively become environmentally unsustainable. Several obstacles which are peculiar to the Environment must be overcome. Goods and services are products of jobs, and jobs are a major societal objective per se. Progress is defined in terms of "more of everything", while happiness and self-satisfaction remain imponderables.

The Author argues that we should be developing a Standard Environmental Damage Unit or EDU. This would permit society to better monitor the environment, and extract more benefits at lesser cost to it, hence improving productivity as well.

Human behavior needs to change. This can happen by leveraging political, commercial and economic forces at all levels. Technology is also key. Mobile audio media technology could help deliver appropriate, timely, geolocated and very targeted useful information and messages that could reach billions of people in real time. These interactions could be in any language, be easily understood, potentially well received, and with a strong immediate actionable impact.

Harnessing people through technology could thus help environmental sustainability goals, generating better environmental awareness, and reduce irrevocable damage that the EDUs could help closely monitor.

In a complex modern interconnected world obsessed with measuring everything it is surprising to find that the environment still lacks a key overall measurement tool.

A common measure of environmental degradation is needed. The next challenge for a productive society will be to develop a cross-system of points, or Environmental Damage Units (EDU) capable of showing, at a glance, the relative impact of human activities on the environment, thus providing another important tool to help in our struggle to achieve Sustainable Development Goals (SDGs).

1. Measures and currency are essential for any society. They persist over time and new ones take time to be accepted.
Every society needs weights, measures and currency to function. To indicate value even cowry shells were accepted. In ancient Athens, handfuls of six metal bars called ?????? were used. This was the origin of the Greek drachma (literally a

handful, a grasp), no longer used in Greece since 2002, but still remembered in the dirham, (didrachma, mis-spelled), the present currency of several Arab and Muslim States.

The drachma was replaced by the Euro. Almost 500 million people in the European Union use this currency every day, but few would recognize the origin of its name in the myth of The Rape of Europa, the maiden seduced by the god Zeus in the form of a bull. After her the Continent was named. (1)

Ancient measures are still used in our everyday life. When we enjoy a 360-degree panoramic view, or take a 180-degree turn, we are using the base 60 numeral system originated with the Sumerians in the 3rd millennium B.C.

One hour is still divided into 60 minutes, and each minute into 60 seconds further divided in order to keep pace with the increased speed of everything we do, from measuring the top speed of downhill skiers to inter-planetary voyages that depend on incredibly precise definition of the second defined as "the duration of 9,192,631,770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the caesium-133 atom (at a temperature of 0 K and at mean sea level)".

For centuries thousands of different weights and measures were in use in Europe alone.
In 1790 the metric system was introduced in France, the meter being one tenth-million of the Earth quadrant passing through Paris, of course. Only a revolutionary National Assembly could impose such a drastic change. It meant throwing away and replacing the weights and measures in every village and household of France, but who was going to argue with the guillotine.

It took 200 years for the metric system to become compulsory in the European Union, and only after Ireland obtained some Derogations to it allowing for the use of measurement such as miles and yards as well as the foot, inch, pint and troy ounces. (2)

Many old units remain widely in use. We still order beer by the pint, sell oil by the barrel, cereals by the bushel, weigh precious stones in carats (the seeds of the carob fruit, carat in Arabic), measure sea depth in fathoms (OE outstretched hands) and vessel speed in knots, race horses over furlongs (a furrow-long, a Medieval agricultural measure of length). Meanwhile, many un-scientific units remain use, such as "a pinch of salt" or "a hairbreadth". Others are purely local, if more colorful. In Venice, Italy a very short distance may be indicated in local dialect as "una pissada de can" meaning "a dog's piss".

Our calendar is also steeped in ancient history. The months from September to December, literally the seventh, eighth, ninth and tenth month of the year, retained their name even after the start of the year was moved from March to January leaving them two months out of step. And the days of the week are still named after Roman gods.

2. Productivity measurements rely on common units.
Now to productivity. Productivity as a ratio of output to input is a neutral term: the choice of output is a political decision. In order to enter the equation, both inputs and outputs need to be measured in standard units easily understood and conveyed.

Today many prices world-wide are still quoted in US dollars, a mis-pronunciation of the Austrian thaler, from the name of the Bohemian Joachimsthal, or Johan's Valley, where silver was mined from the 16th Century.

The price of a K2 Black Panther tank ($8 million) and that of an average mountain bike ($400) so 20,000 mountain bikes the cost of a tank. This does not mean that they are interchangeable, once a tank always a tank, but the comparison helps decision makers.

In the realm of the Economy the QRS Catalogue now lists up to 100 million products. We can remove one product and almost nothing will change world-wide. But if we allow one species to become extinct, we do not know for sure how the web of life will respond. How do we measure this in any case?

Some inputs are visibly limited. Others were considered practically limitless, like the sand of the deserts, until the shortage of quartz sand from China impacted the production of microchips in Taiwan which limited the production of cars in Germany and the USA. It takes a second for a resource to go from limitless to limited then unavailable.

But the road that led society to start measuring resources and then ecosystems was long and winding. It first required states to question their geography. They started by measuring their territory, then more recently their ecosystems and currently their degradation with an array of instruments/units.

In the past distances were measured in days' walk, a mile being Mille passus (1000 strides) of the Roman legionnaires. The App. on our smartphones that counts our steps is nothing new. In China it was the li, but the same distance was shown as being longer if the road went uphill, shorter if downhill, as dictated by experience and common sense.

Two hundred years ago modern States felt the need to measure their territory, and it all happened within the same decade. Louis XVI asked his Royal Astronomer Cassini to produce the first Carte Géométrique de France (1750-1815), finding it much smaller than was previously believed. In 1802 the British Raj carried out the Great Trigonometric Survey of India noting all its natural and man-made features. In 1804 the 8000-miles Lewis and Clark Expedition provided the first information on the Louisiana Purchase, the lands West of the Mississippi, bought by the U.S. - sight unseen - for 15 million dollars.

Having measured their territory, only recently did the countries begin to measure their ecosystems, now that satellite images and computing capacity enable us to try our hands at natural capital accounts.

Canada piloted a census of its environment to create a National Register of Canada's ecosystem. Successive US Administrations tried the same, recording the changes in America's stock of natural resources and quantifying losses in order to develop a single statistic alongside GDP by the year 2036. (3)
These initiatives are putting numbers to the environment, as a hospital might count the diseased without showing the cause of death. When dealing with the Environment the true cause is rarely mentioned. The elephant in the room is us, the people.

3. The Environment and human needs.
We tap the Environment to meet human needs. Mahatma Gandhi said the Earth can satisfy man's need, but not man's greed. There lies a vast area falling between these two, and needs evolve over time. Basic ones such as shelter, clothing and transportation have had strong environmental impacts.

For thousands of years mankind sheltered in caves or under overhanging cliffs.
The First Nations of the Great Lakes region and eastward built wigwams with an arched framework of poles overlaid with bark, mats, or hides, all bio-degradable materials. Today, the Chicago skyline is one of the world's tallest easily ranking among the most imposing.

In East Africa indigenous tribes built thatched-roofed, plastered mud houses, using them as homestead. Today, in every African metropolis, a sky-scraper is often the first building that comes up on what was before wild savanna. The rate of change has accelerated beyond recognition. (4) When we first arrived in Kenya as a team to set up the new UN/UNEP office HQ in 1973, Nairobi had a few hundred thousand people and could be crossed by car in 30 minutes. Today it takes

sometimes hours to get to the town hall. The metropolis will soon reach 3 million souls, not counting another 1 million probably living under the census radar.

All this has a cost. Only when stones, cement and steel came to be used in construction did we alter irretrievably almost 75 per cent of the earth's surface and were forced to think in terms of Creative Destruction.

Space is the resource whose disappearance as a result of urbanization is the most measurable. Its availability has become the constraining factor in the provision of proper housing to millions.

Population density in cities has reached alarming proportions. The list is headed by Manila with a population of 43,000 per sq.km. immediately followed by three more cities in the Philippines(5). But the true image is obtained by looking at their most densely populated districts. There we find Cairo's Imbaba District topping the list with a population density of 177,000 per sq.km.(6)

Perhaps people are getting used to having no space. After all in Hong Kong nanoflats of 128 sq. ft. are for sale, or cubicle homes of 25 sq.ft. Le Corbusier must have foreseen the problem in 1951 when he designed on the French Riviera Le Cabanon, measuring 3.6 m. by 3.6 m., since declared a UNESCO World Heritage Site.

With more than half the world population now living in cities, when we teach youngsters to "protect Nature" what does "Nature" mean to them? The house pet? The occasional tree-lined street? The crowded beach of their short vacations? Or the invasive species found in Rome with million strong flocks of starlings that smother cars with their droppings and wild boars roaming the Eternal City to feed on the abandoned garbage?

If this is "Nature", they may be right to think that anything man-made is better.
The garment industry also depends on the individual choices of millions of consumers. Driven today by fast fashion, new lines are released every week, when historically this happened twice a year.

This industry is a great consumer of water, releases from 25% to 35% of micro-plastics in the oceans, produces 60 million tons of garments of which 60 billion pieces in the USA alone are discarded within a year of being made. But it employs 300 million people globally that work.
And if living and clothing ourselves has an impact and is complicated, travelling is even worst. On public transport during rush hours the number of people inside the carriages often far exceeds the EU norm for the transportation of live animals.(7) The rush hour in Tokyo with the white gloved pushers squeezing passengers on trains is an extreme travel experience not to be missed - unless you are claustrophobic.

The consumer economy pushes us in the direction where more goods are chasing customers, planned obsolescence requires continuous replacement, 340,000 vehicles of 1976 becoming 1.4 billion today, with two more entering the road every second.

Approximately 1.3 million people die each year as a result of road traffic crashes which cost some countries up to 3% of their gross domestic product according to the WHO.

The problem is that we are too many growing too fast. The world population grows at a rate of 2.6 per seconds according to the World Bank, 2 billion when I was born, 4 billion when I took my first job, 6 billion when I retired from the U.N., 8 billion as I am writing this page.

This growth is untenable especially if we look at it from the perspective of the environment.
When people take part in the Economy they are called consumers, in the sense that they buy goods and services.

But in relation to the Environment, they are consumers in the literal sense, as defined by the Concise Oxford Dictionary:
to consume = completely destroy, reduce to nothing or reduce to tiny particles;
use up (time, energy, etc.).

It is time to involve people on the positive side of productivity of the Environment, in larger numbers than are now active as "environmentalists". We need to be better informed and motivated, through better communication. The use of mobile audio media technology could render everyone a participant in the sustainability equation.
Human behaviors need to change. This can happen by leveraging political, commercial and economic forces at all levels assisted by delivering appropriate, timely, geolocated and very targeted useful information to billions of people in real time, in any language, via technology. This will have a strong immediate actionable impact.
Harnessing people through technology could help SDGs, generating better environmental awareness by reducing irrevocable damage that EDUs could help closely monitor.
4. Environment is a global issue.

Once our ecosystem is measured, damage to it must also be measured covering sources, pathways and sinks.
At present each element is counted differently: some in square kilometers, some in parts per million, some in kilometers per year, some in simple numbers.

Carbon footprints have been calculated for construction, shelter, food, clothing, mobility, manufactured products, services, and trade; whilst forest loss is examined in hectares; loss of biodiversity by number of species; desert creep in km; soil erosion by the RP methods; plastic in the sea in tons/sq.mile (with the Great Pacific Garbage Patch too large to measure); litter on beaches in the number of items per 100-meter stretch of beach, (712 items on average on the Atlantic coast); Wind force on the Beaufort scale o -to-12; Hurricane force on the 1-to-5 Saffir-Simpson scale; Rainfall in mm; hail on the Torro Hailstorm Intensity 0-to-10 scale; pollution of the sea and of the air in parts per million; the melting of glaciers and icecaps by changes in their gravitational pull; noise in decibels 20-to-140; light in lumens and so forth….
How can we find a common measure of environmental degradation when there are so many contrasting measurements and scales?

Furthermore, degradation of the environment is the result of millions of individual actions, good in themselves, but taken together harmful to the environment. Environmental degradation is rarely the result of intentional, malevolent actions.

Small, everyday actions, harmless in themselves, when multiplied by the 8 billion actors, day in day out, are hurting the environment like the Chinese Lingchi, the death of a thousand cuts. Using a 2-ton SUV to take children to school, a faucet left running, a vacation taken on the other side of the globe. It is all done for a good reason: convenience, labor saving, hygiene. Taken together, they become unsustainable, since it is the people who, through billions of everyday actions, exceed the Earth's carrying capacity.

It is up to people to limit the damage by changing behaviors and lifestyles. But in order to achieve this, we must be individually involved through better communication. This again requires a common measure of environmental to succeed. Without it, how can we communicate and reward solutions and common efforts to solve problems that regard all of us. We must be able to measure change with a global outlook.

The first steps towards this global outlook took place not long ago.
A proposal by Sweden at the UN General Assembly in 1968 (for comparison, the The American Society for the Prevention of Cruelty to Animals (ASPCA) was founded one century earlier, in 1866) led to the convening of the UN Conference on the Human Environment - UNCHE in Stockholm in 1972.

I shall be forever grateful to the Canadian Maurice F. Strong who asked me to join the secretariat of UNCHE and the newly established United Nations Environment Program (UNEP) in Nairobi in 1973. With forward looking vision and the passionate effort of a then small team of people, we managed to push the Environment to the top of the international agenda, at a time when many languages lacked a word for it.

Back then, there were words for ecology, nature, flora, fauna, wildlife, the atmosphere, etc. but none to indicate the environment as a whole, taking Albert Einstein's definition of the Environment : it is everything that is not me.
In Italy in 1972 the dictionary carried only two meanings for the word ambiente, environment:

- An enclosed part of a building, which could be vast or small, luxurious or poorly lit, and so on;
- An association or group of people similarly engaged - which could be applied to finance, politics, or the underworld.

And when a new government department was set up to deal with the matter it was called Ministry of Ecology, later renamed Ministry of the Environment (Ambiente), then again Ministry of the Ecological Transition.

Despite many victories in this field, it has been an uphill struggle. Putting aside political will power and access to proper financing, we must find a way of developing a common measure of environmental degradation to start solving global environmental problems together.
The next challenge will be to develop a cross-system of points, or what we could call Environmental Damage Units (EDU), capable of showing at a glance the relative impact of human activities on the environment.

We must devise a single way of defining and measuring how we are ruining our home, planet Earth - if we want to start saving it together.

Endnotes:

(1) Iliad XIV vv. 315-316 and 321-322 . Ovid Metamorphosis II 833-75
(2) Council Directive 80/181/EEC of 20 December, 1979 on the approximation of the laws of the Member States relating to units of measurement.
(3) Looking beyond GDP: The Economist, 17 September, 2022.
(4) The indigenous rondavel - a case for conservation: Steyn, Gerald, 2006.
(5) Ref: www.worldpopulationreview.com
(6) Ref: data.worldbank.org/indicators /EN.POP.DNST
(7) Council Regulation (EC) No 1/2005 of 22 December 2004 on the protection of animals during transport and related operations and amending Directives 64/432/EEC and 93/119/EC and Regulation (EC) No 1255/97 (OJ L 3, 5.1.2005, pp. 1-44).

Productivity For a New Age- Raising the Bar

Thomas C. Tuttle, Ph.D.

In a world that is caught up with Generative AI, expanding wars, and political turmoil is "Productivity" still a relevant concern? Some feel the time to talk about productivity has passed. Others feel it is time to redefine productivity. What stance should an organization such as the World Academy of Productivity Science adopt? What criteria should be used to judge whether a person should be considered as a Productivity Professional worthy of induction as a Fellow of the World Academy of Productivity Science? This article argues that Productivity is still relevant and essential for the collective well-being of our world. However, as has always been the case productivity is an evolving concept. We are at a choice point in history. What we do will impact and possibly determine whether we will be able to shape the outcomes that political, technological and economic forces create, or will these forces shape us in ways that will not promote a higher quality of life.

In turbulent times, it is always helpful to return to one's roots and re-examine some fundamental values and beliefs. With respect to Productivity, a helpful starting point is to return to the post-world war period when Japan was recovering from the devastation of the nation following WWII. It was during this period when several advisors from the West were dispatched to Japan to collaborate with the Japanese scientists and leaders working to build a recovery strategy for the battered nation. In an island nation such as Japan which had few natural resources other than its land, its people and their intellectual capital, the strategy had to stress ways to make the most efficient and effective use of all resources, both domestic and imported. As a result, productivity became a central and essential concept for the rebuilding of Japan.

In the same period, WWII had also created significant destruction in Europe. One of the very significant post-war rebuilding efforts in Europe came from the Marshall Plan spearheaded by the United States and named for Secretary of State George Marshall. A major goal of the Marshall Plan was to increase production within European nations as a means of rebuilding economic and social stability. Selfishly, from the U.S. perspective, another goal of the plan was to create markets for American products. Part of the initiative included technical assistance to European private sector organizations with respect to management and labor relations. This was delivered in part through a network of Productivity Centers established within European nations. The motivation for this initiative was similar to the rebuilding of Japan in that it recognized the relationship between productivity, economic development and quality of life. At the time, there was great concern in the West that social instability due to lack of jobs in Europe would lead more countries to adopt communism as their economic system.

Following the war, the Allied occupation of Japan focused on restructuring the government and the economy and preventing the rearming of the nation. During this period, the Chinese civil war was underway and when it became obvious that the communist forces would win, the Allies feared that communism could spread to Japan and much of East Asia, especially Korea and Taiwan. This fear heightened the emphasis for rebuilding the Japanese economy. A major concern was the shortage of raw materials to support industrial development. When the war in Korea began in 1950, Japan became a principal supply base for Western Forces in Korea which served as a boon to the Japanese economy. A treaty and security agreement with Japan was signed in 1951 by 49 of the 52 nations who participated in the war. The USSR, Poland and Czechoslovakia objected to the agreement's promise to support the Republic of China and to not do business with the People's Republic of China.

Following the signing of the security agreement, there was a concerted effort to accelerate the rebuilding of the Japanese economy. One of the organizations that was important to this effort, was the Japan Productivity Center established in 1955. The Japanese Productivity Center (JPC) was created to bring together leading Japanese scientists

along with international advisors to guide and assist the economic development effort. The JPC defined productivity as both a micro and a macro concept. The macro concept specified the outcomes that should result from applying the micro improvement concepts. Productivity was viewed as mechanism to create a constantly improving quality of life through the improvement of the ratio the of the outputs produced from a given set of input resources. In Asia, the concept of productivity has always emphasized this dual purpose- to create societal happiness and to provide the methodologies to do so.

Over time, as these concepts became widely implemented, Japanese products, which in the 1940's and 1950's had been low value-added and poor quality, continually improved and became higher value-added and displayed superior quality. As the Japanese domestic economy grew, it became clear that substantially improving the quality of life for Japanese citizens (i.e. the macro productivity view) required products that could be exported and successfully be sold abroad. By the mid to late 1970s's, the Japanese were creating products in markets such as electronics, automobiles, and appliances that were taking substantial market share away from Western producers.

The fears provoked by loss of market share to Japanese imports many western companies such as AT&T, Motorola, General Motors, Ford, Xerox, General Electric, etc. led western executives to launch "study tours" to Japan to see what was going on and what they could learn. One Motorola executive in a conference I attended when asked what provoked Motorola to seriously launch their Total Quality Initiative responded that it was when we realized that "our survival was at stake." However, when Western business executives traveled to Japan, they brought with them "Western" eyes that could not fully appreciate what they saw. Coming from an economy caught up with economic theories that suggested that businesses existed to maximize returns to stockholders, these executives failed to appreciate the Japanese miracle. They focused on micro productivity and looked for ways that the Japanese reduced costs, cut production cycle time, machine down time, costs of maintenance, and developed methods for more efficient management of inventories, and the reduction of material waste. They focused on how the Japanese improved speed and reduced costs. While these lessons learned were relevant, they were only part of the productivity strategy of Japanese organizations. Because of their western business paradigms, they either failed to see or to be interested in how the Japanese saw productivity improvement from the macro perspective as a way to improve their quality of life and how it improved outcomes for a broader set of stakeholders than just shareholders. What they also failed to see was that the Japanese took a long-term view of seeking to gain market share rather than to focus primarily on short term profits. By 1994, the Japan-led, Asian Productivity Organization launched the term "Green Productivity." In 2000, a book was published entitled "Japan's Green Comeback: Future Visions of the Men Who Made Japan". In this book a chapter written by Kosuke Yamamoto, EVP of Toyota Motor Corporation refers to a survey conducted by the Nihon Keizai Shimbun newspaper in November 1997. This survey asked several questions of executives in 1,295 publicly listed companies in Japan. Based on the responses to the 14 questions, the newspaper established a scale based on how much consideration each company gave to the environment and then used this scale to rank the top 100 companies on their environmental performance. The results showed that the top 30 companies in terms of environmental results had an average revenue improvement of 4 percent compared to a revenue increase of the bottom 70 companies of 2 percent. The top 10 companies had a profit improvement rate of 54 percent compared to the bottom 90 companies whose average profit improvement rate was only 18 percent. This led the newspaper to declare that "Green can be gold."

Even in the 21st Century, the prevailing view of productivity in the United States and in Japan and most of Asia are somewhat different. In 2003, the Secretary General of the Asian Productivity Organization Takeshi Tajima stated: "the ultimate objective of productivity improvement was to realize a better quality of life for all people." This "Big P" view is quite striking because it not only emphasizes the need for productivity improvement, but it also emphasized sharing the benefits of productivity improvement to "all people" not just to shareholders of a business. Contrast this view with the current view of productivity expressed by the U.S. Bureau of Labor Statistics: "productivity is a measure of economic performance that compares the amount of goods and services produced (output) with the amount of inputs used to produce these goods and services. The Nobel Prize winning economist Paul Krugman from the U.S. expressed a

somewhat broader view of productivity than that provided by the Bureau of Labor Statistics when he stated: "Productivity is not everything, but in the long run, it is almost everything. A country's ability to improve its standard of living over time, depends almost entirely on its ability to raise its output per worker." In the US, the macro view of productivity stressing improved quality of life tended to be held by macro-economists while the micro view is the focus of industrial engineers. Business executives, focused on creation of shareholder value rather than broader stakeholder value have tended to pay more attention to the micro-productivity, cost reduction point of view.

In 2008, John Heap and I published an article that expressed a view that even the western view of productivity was finally evolving from the narrow "small P" view to a broader multi-factor view. We were influenced by several writers who suggested that the success of a business should be measured by more than a financial bottom line. John Elkington suggested that the bottom-line concept should be expanded to include a social and an environmental bottom line as well as a financial bottom line. We elaborated on that view to include the idea that any measure of performance should have a numerator and a denominator to reflect the volume output in relation to the volume of input - a core productivity idea. This is important because if you compare two organizations with respect to social and environmental performance results, it is important to ask what the input resources were required to achieve a given level of social or environmental results. The organization that more efficiently creates a given level of social or environmental outcome will be more successful than one which uses more resources to achieve the same level of results. Heap and I suggested that organizations should be evaluated in terms of the "three productivities - Social productivity, economic productivity and environmental productivity. John Heap later coined the term "SEE Productivity" to capture the notion of the three productivities.
As climate science has evolved and as social activism has evolved it is not surprising that businesses have come under increasing pressure to broaden their strategies to consider a broader range of risks and stakeholder concerns. For some time, William McDonough, an architect and designer and his collaborator Michael Braungart, a chemist have called for businesses to pay more attention to their environmental impact. McDonough states:

"Many companies are doing good work to reduce their negative impact on resources and workers, but often through a narrow perspective focused on piecemeal improvements. They improve transparency and traceability and make some processes more efficient but pay little attention to their heavy use of toxic chemicals. They develop complex recycling for hybrid materials, rather than redesign the product and delivery for full-value recycling…What if companies built sustainability into the very design of their products and production processes? No longer would they design products to meet cost, appearance and functional requirements and only later work to mitigate the harms from those choices. They could even go from a linear design for disposal to a design for continual use and reuse. They could focus on generating positive impact, not on reducing negative impact. When it comes to sustainability, they could create "more good" instead of simply being "less bad."

To pursue that point of view they have defined a set of "five goods" that should be enhanced in terms of the focus of a business. The "five goods" that should guide product and process design are:

"Good materials - safe, healthy, designed for reuse and recycling.
"Good economy - from a linear economy of "take, make, waste" to a circular, remake, restore. - growing, circular, shared, benefiting everyone.
"Good energy - renewable and clean
"Good water - clean, available to all, leaving the water as good or better than when production started
"Good lives - promote human dignity, safe working conditions, just and fair and accommodating to family circumstances.

Following the 2001 World Productivity Congress held in Hong Kong and in Beijing, John Heap and I participated in a symposium that was organized by the China Association of Productivity Science (CAPS). During this World Congress,

China's Vice Premier Wen Jiabo called for CAPS to propose a new Productivity Agenda for China. This led CAPS to set up over a dozen working groups each focused on a major topic area in a comprehensive, national productivity agenda. This symposium had several speakers with each representing one of the work groups. The presenter from the Environmental Productivity working group recommended that the method for measuring national economic performance should be changed. Presently, businesses that create waste and pollution while making and selling products receive a certain amount of money as a result of their product sales. The presenter's point was that the overall GDP counts revenue that covers a producer's total costs. However, some of these costs cover the production of "good value-added output" and some of the costs cover the cost of producing "waste, pollution, emissions" which are "bad non-value-added outputs." This led him to conclude that for the economy it would be desirable to report "Good GDP" and "Bad GDP" as disaggregated statistics. Obviously, this would be an incentive for businesses to increase Good GDP and decrease Bad GDP and for the development of national policies that promote and reward Good GDP production.

These thoughts harken back to a speech given by Robert Kennedy in 1968 in the U.S when he was a candidate for President. He vividly and eloquently captured the limitations of GDP as a measure of economic success. Since GDP per capita is often used as a surrogate for productivity growth it is helpful to review Kennedy's critique of this flawed indicator.

…Too much and for too long, we seemed to have surrendered personal excellence and community values in the mere accumulation of material things. Our Gross National Product now is over $800 billion dollars a year, but that Gross National Product-if we judge the United States of America by that- that Gross Nation Product counts air pollution and cigarette advertising, and ambulances to clear our highways of carnage. It counts special locks for our doors and the jails for the people who break them. It counts the destruction of the redwood and the loss of our natural wonder in chaotic sprawl. It counts napalm and counts nuclear warheads and armored cars for the police to fight the riots in our cities. It counts Whitman's rifle and Speck's knife, and the television programs which glorify violence to sell toys to our children.

Yet the gross national product does not allow for the health of our children, the quality of their education or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials. It measures neither our wit nor our courage, neither our wisdom nor our learning, neither our compassion nor our devotion to our country, it measures everything in short, except that which makes life worthwhile. And it can tell us everything about America except why we are proud that we are Americans.
We don't know if the Chinese speaker had read Kennedy's speech. However, he shared Kennedy's concerns. In recent years many government leaders and economists have expressed their concern over the inadequacy of GDP measures of national well-being. However, despite many separate initiatives to develop alternative metrics, no widely accepted alternatives have been implemented. The only nation that has seriously implemented an alternative is the nation of Bhutan. The story of Bhutan is interesting, and the message is that implementing an alternative system is a question of both values and strong leadership.

In 1972, at the age of 16, Jigme Singye Wangchuck became the 4th king of Bhutan. As a youth he had been sent to English schools in India and then in London. He returned as a teenager to learn about his future kingdom. Zachary Karabell describes the story in his book "The Leading Indicators".

"The new monarch had seen just enough of the world to know that success globally was increasingly being defined by gross national product. And yet, the teenage king had a bold idea instead of gauging a country by how much stuff it produced, measure it by something else. Instead of emphasizing production and output, emphasize quality of life…."

The index that the King's staff created defines "happiness" as "the creation of enabling conditions where people are able to pursue well-being in sustainable ways." It is not an indicator of individual happiness, but it is rather a measure of collective conditions that meet "spiritual, material, physical and social needs." In essence this is the highest function of a

government. Bhutan is the first and, so far, the only nation to have rejected GDP as a measure of societal success. Many other nations have realized the problems of GDP and have explored options, however none have had the leadership or political will to make the needed change.

A serious effort in this direction was launched by President Sarkozy of France in 2008. He pointed out the following: "I have a firm belief that we will not change our behavior unless we change the way we measure our economic performance." Sarkozy seemed to be motivated by his concern for the credibility of economic data that was published by government experts and the gap between what the experts claimed and the life experiences of ordinary citizens. This is quite like the situation today in the U.S. when the official economic data says the economy is strong but the average citizen in Ohio or South Carolina does not feel their life reflects what the data is saying.

Sarkozy created a Commission to move beyond GDP. He chose two Nobel Prize winning economists to lead the effort, Joseph Stiglitz and Amartya Sen and a French economist Jean-Paul Fitoussi. This commission developed a set of indicators that included issues such as education, gender equality and environmental sustainability. It was a serious effort that sparked similar initiatives in other parts of Europe. However, the Sarkozy Commission did not attempt to suggest policy initiatives that were inspired by the metrics. It does little good to develop metrics if they are not used to modify policy. However, it is policy that produces the backlash and major hurdles to implementation. There is resistance from those who will be harmed by the new metrics.

An example of the hurdles to policy implementation can be illustrated by an example in which the U.S. Department of Commerce launched an effort in "green accounting" that attempted to quantify the financial impact of environmental harm. The initiative called for accounts to track things like air quality and the depletion of mineral resources which did not please the mining industry. When learning about this initiative, a Congressman from West Virginia a major coal mining state said these measures are going to cause someone to conclude and say ".. the coal industry isn't contributing anything to the country." at an appropriations hearing. This reaction caused Congress to cancel the initiative. A subsequent review of the approach by the National Academy of Sciences strongly endorsed the methodology and recommended its implementation. These recommendations were ignored.

Another example of the difficulty of shifting the paradigm of Global Capitalism from the GDP focus can be seen at the individual firm level from the experiences of a very dedicated and seasoned executive chosen by a major U.S. Corporation to guide the implementation of their CEO's ambitious and visionary strategy to transform the business. The company was DuPont, a major global chemical company and the time was 2000-2002. The Chairman and CEO of DuPont was Chad Holliday who was convinced that the strategies that had made DuPont successful were not the strategies that would allow the company to sustain its success. In an article in the Harvard Business Review, Holliday wrote the following:

"Like many manufacturing companies, DuPont traditionally had grown by making more and more 'stuff.' And our business growth has been proportional to the number of raw materials and energy that our plants use - as well as the resulting waste and emissions from our operations. Over the years we, though we have become increasingly aware of an inescapable and disturbing fact: We will not be able to sustain our business over the long haul because they are based on two assumptions that no longer hold. One is that cheap, unlimited supplies of hydrocarbons and other non-renewable resources will always be available. The other is that the earth's ecosystems will indefinitely absorb the waste and emissions of our production and consumption.

In addition to being Chairman and CEO of Dupont, Holliday also served as Chairman of Board of the World Business Council for Sustainable Development and currently serves as the Chairman of the Global Federation of Councils on Competitiveness. There can be no doubt that he was committed to this new strategy. Chad was fortunate that his Vice President of safety, health and the environment, Paul Tebo, was a talented and experienced business executive, who, in

his staff role, had the responsibility for translating DuPont's commitment to Sustainable Growth into tangible business strategies and have them implemented in DuPont plants and business units across the globe. Tebo described some of the challenges he had in convincing business unit leaders to adopt this new strategy:

("My experience in running a couple of billion-dollar global businesses) ..has been invaluable in understanding how to communicate environmental concepts in business terms and integrate sustainable growth concepts into line organizations. And sustainable growth, he argues - as opposed to development- was critical in getting the message across to Dupont collogues. Growth was very important. I tried sustainability, and the business leaders saw it as status quo. I tried sustainable development, and they viewed it as environmental sustainability. I tried sustainable business, but growth is what organizations want - either you are growing or you're not and not growing is not a very good sit."

The brilliance of the sustainable growth concept is that it is measured in terms of Shareholder Value Added/lbs. of depletable resources. As with any ratio there are four ways that the ratio can improve and two of them involve decreasing the use of depletable resources. This is a productivity metric that incentivizes the reduction of input resources in relation to the growth of shareholder value added. The use of this approach helped DuPont cut toxic air emissions by 70%, hazardous waste production by 40%, greenhouse gas generation by 70% and savings of $3 billion between 1990 and 2004.

The story also illustrates the difficulty in "selling" the environmental message to executives who are in a system that rewards growth. DuPont was very creative in its ability to combine a focus on financial business growth which also produces environmental benefits. While this approach has merit, it does deal with all the risks that companies have. DuPont's history following the enlightened tenure of Holliday and Tebo, illustrates McDonough's point about what can happen when a company pays insufficient attention to the business risks associated with toxic chemicals in a product.

Corporate Perspective

The evolution in productivity thinking over the past 7 decades can be discussed with respect to different units of analysis. Much of our discussion to this point has emphasized the national economy level (Big-P). However, we can also examine the evolution in thinking at the individual company level (Small-P) as we have with the DuPont discussion.

One way to view the shifts in corporate thinking is to view corporate activity and thinking through the "sustainability lens." In 2002, Price Waterhouse Coopers reported on a survey of 140 companies with respect to their strategic moves toward sustainability and why. They found that 77% of the companies with annual revenue over $25 billion have defined the meaning of sustainability for their business. However, only 45% of companies under $25 billion have done so. When asked why they have adopted sustainability business practices the results are shown below:

"Enhanced reputation - 90%
"Competitive advantage 75%
"Cost savings -71%
"Industry trends- 62%
"CEO / Board commitment - 58%
"Customer demand - 57%
"Top line growth - 37%
"Shareholder demand - 20%
"Access to capital - 12%

The study concluded that failing to meet the sustainability standards presents a series of financial and business risks to companies including the following:

"Lower stock prices and reduced shareholder value
"Loss of valuable customer or supplier relationships
"Inability or difficulty in obtaining director and officer insurance
"Reduced access to or higher cost of capital
"Paying damages relating to shareholders or consumers for false claims, unfair labor practices, product liability, negligence and "social malfeasance"
"Delay or termination of projects
"Loss of "license to operate"

The authors of the survey, two partners of Price Waterhouse Coopers, drew the following conclusion: "While sustainability is a new and evolving standard, most of the companies we surveyed believe that it represents a permanent change in the way companies will be evaluated in the future.

This observation has proven true. In 2023, the U.S. Securities and Exchange Commission has required that firms listed on the Stock Exchanges, initiate sustainability reporting in 2023. According to a survey conducted in 2022 by Deloitte, 99% of the 300 reporting companies have launched or will launch an ESG council or working group to manage their reporting requirement.

In the survey, respondents were asked to share the benefits they expect from their ESG reporting initiatives. Listed below are the benefits and the % of respondents that listed this benefit in their top three expected results:

Talent attraction and retention - 52%
Increased efficiencies - 52%
Enhanced trust with stakeholders - 51%
Brand reputation enhancements - 49%
Premium pricing of products - 49%
Reduced risk - 49%

While "productivity" was not explicitly mentioned, a number of these benefits would seem to serve as "productivity drivers." Certainly, increased efficiencies and talent attraction and retention should be very consistent with enhanced productivity.

The survey team found evidence that businesses are integrating sustainability reporting into their business strategy process. They base this conclusion in that the responsibility for reporting rests with either the Chief Sustainability Officer or the Chief financial Officer. In smaller firms without a Chief Sustainability Officer, the responsibility is most often given to the Chief Human Resource Management Officer. Clearly compared with the results from the 2002 Price Waterhouse Cooper's survey, much has changed in the attention being paid to Sustainability initiatives in 2023.

A study conducted by the Swiss Finance Institute listed over 30 nations that have some form of mandatory sustainability reporting. Their study investigated the impact of reporting on the performance of capital markets in the countries. Their conclusion was that ". ESG disclosure regulation improves the information environment and has beneficial capital market effects." They also found that the effects were strongest if the disclosure requirements are implemented by government institutions and are complemented with strong enforcement by informal institutions.

Toward a New Productivity Paradigm

While the behavior of major global firms is slowly changing, there are extremely wide gaps between current behavior

and the ideals expressed by key leaders such as William McDonough and others. As we focus on a new productivity paradigm, it is necessary to significantly raise the bar with respect what is needed and where we need to go as a civilization. It is fair to say that what we are seeing across the economy is slow, steady improvement. However, there are a growing number of organizations that have shifted to a new paradigm which provides hope that dramatic, step function improvement is possible.

Often the annual gathering of global leaders in Davos, Switzerland, offers the opportunity to hear from some of the exemplary practitioners. In past years, with respect to raising the bar for businesses in terms of new paradigms, Davos has provided some role models. However, with respect to new productivity paradigms, it seems that the reports from the Davos gathering this year were different.

In a very insightful post following his time in Davos 2024, Dennis Gada, Executive Vice President and Global Head of Banking and Financial Services at Infosys, pointed out that a key theme of this year's gathering was "Rebuilding Trust." It turns out that a good place to start any discussion about new directions for Productivity would be to talk about the need for trust in a divided, hyper politicized world. Talking about Trust requires us to examine our values and it requires us to examine the types of relationships that enable productivity breakthroughs. Sustained rapid improvement of productivity requires open information sharing and collaboration. Shared values and effective communication are essential enablers of productivity improvement, and the degree of trust determines the size of the pipe through which information can flow to enable collaboration and innovation.

The spread of autocratic leadership around the world destroys trust. New technologies such as generative AI, quantum computing, synthetic biology and others offer great promise for productivity enhancement but only where is trust in the algorithms and in the motives of people who are the researchers, enablers and implementers. Traditional Milton Friedman inspired capitalism that claims that the only purpose of a company is to produce maximum returns to its shareholders does not inspire trust in people who are seen as non-value added to the pursuit of profit or who are adversely impacted by pursuing profit above all other considerations. Ethics on the part of business leaders who have escaped the Milton Friedman dogma, and informed regulatory action by government are required when businesses have too much power and when markets fail to operate fairly. Unequal opportunity leads to unequal outcomes and unequal opportunity erodes trust. When businesses seeking to maximize profit are constrained by regulation which they view as unjustified less ethical leaders become bitter and criticize government for imposing restrictions on their activity. This erodes trust and support for government which is essential to create a fair competitive playing field and one that is free of risks to health and safety.

Gada offers a helpful perspective on what is required to enable the potential productivity gains from generative AI to be realized. In his report from Davos, he stated:

' "Rebuilding Trust" through technology is pivotal to increased adoption. Even as the regulatory environment for AI is still evolving, governments and regulatory watchdog have begun introducing regulations - the US Government's Executive Order, the EU AI Act, and the UK's Bletchley Park Agreement- so firms can build ethical, responsible AI. Institutions, on their part, must integrate ethical considerations into the design and architecture by developing a responsible design framework for ethical AI usage."

The importance and necessity of Gada's caution is amplified by writers such as Ted Chiang In his recent New Yorker article, Chiang asks about AI: "The technology, as it's currently imagined, promises to concentrate wealth and disempower workers. Is an alternative imaginable?"

My former colleague and friend Dr. Amit Gupta , pointed out to me that what is required in the new productivity paradigm is a marriage of the ethical implementation of technology within a new business paradigm. I submit that the

best description of the new business paradigm that I have found to date can be found in a recent book by Paul Polman and Andrew Winston - Net Positive: How Courageous Companies Thrive by Giving More Than They Take. The authors also published an overview of the book in their Harvard Business Review article "The Net Positive Manifesto"

The argument for Net Positive is compelling. It borrows from the psychology of behavior modification and the notion of positive reinforcement, and it is consistent with the suggestion by William McDonough for business to abandon the pursuit of doing "less bad" in favor of "doing more good." I first saw a step in this direction many years ago implemented in business by Will Potter, CEO of a Maryland trucking company called Preston Trucking. Will was dealing with a very tough, hard-nosed Teamster union environment that was struggling to survive following trucking deregulation. He set out to change the culture of the company by focusing on "things done right" rather than "things done wrong." As an example, he modified most of the traditional measurement indicators used to manage the company. Instead of "absences" he measured "presences". Instead of measuring "late deliveries" he measured "on time deliveries." Instead of monitoring drivers to promote safety and punishing drivers who were speeding, he carried a speed gun with him on the road and found drivers who were driving the speed limit. Will would pull the safe drivers over to the side of the road and say to the driver "Thank you for driving the speed limit." The culture changed dramatically. Unfortunately, even though the culture change significantly improved company performance, it was not enough to save the unionized company from the cost disadvantages resulting from de-regulation.

Net positive builds on the notion proposed by William McDonough to shift from "less bad" to delivering "more good" outcomes. A net positive business as described by Polman, the former CEO of the global consumer products company Unilever and his co-author Andrew Winston, an expert on sustainable business is one that: improves well-being for everyone it impacts. It delivers positive outcomes for every product, every operation, every region and country, and for every stakeholder including employees, suppliers, communities, customers, and even future generations and the planet itself. This is the "North Star - where a company should be headed.

Some key points included in the Net Positive Manifesto include:

1.Society's expectations of business have changed more in the past two years than in the past 20. Businesses are changing too, just 7% of the CEO's in the Fortune 500 believe that companies should "mainly focus on making profits and not be distracted by social goals.

2.Traditional corporate social responsibility and philanthropy are inadequate for our times. Leaders must rethink what a business is and how it drives change in the world.

3.There are four critical paths to thrive today and win in the future:
a.Operate first in service of multiple stakeholders- which then benefits investors (rather than put shareholders above all others.

b.Take full ownership of all company impacts.
c.Embrace deep partnerships, even with critics.
d.Tackle systemic challenges by rethinking advocacy and the relationship with governments. Work with governments to change systems.

The book is written from the perspective of a Net Positive practitioner because Paul Polman used this philosophy to transform the culture and business practices of Unilever, a $66 Billion global business. The core Net Positive strategy was guided by the Unilever Sustainable Living Plan. The plan had three core goals with supporting action plans and time parameters:
"Improve the health and well-being for more than 1 billion people through their product offerings.

"Reduce Environmental Impact by Half
"Enhance Livelihoods for Millions of People

After 10 years in 2020, the plan had hit most of its goals, for example:

"Over 1.2 billion Euro costs were avoided
"Helped 1.3 billion people improve health and hygiene
"100 % renewable energy for electricity in manufacturing
"Achieved 65% reduction in CO2 from energy in manufacturing
"Global gender parity in management - 51% of managers are women
"67% of agricultural raw materials are sustainably sourced up from 14%
"Water use down 49% per ton of production
"Zero waste to landfill at all factories

In this article, it is only possible to provide a glimpse of what it means to seriously pursue Net Positive. The book provides 10 chapters that give the reader a much better understanding of the approach, the benefits, and the challenges. No company has achieved net positive. But a growing number are choosing to move in this direction. The book also offers suggestions for how to get started and suggests ways to make what may seem unattainable possible. Any business can begin the journey by setting achievable benchmarks and milestones that lead toward the ultimate goal.

Polman and Winston provide a strong rationale for Net Positive. In writing this article, I would urge all the Fellows of the World Academy of Productivity to give serious consideration to this new productivity paradigm. Let me conclude by sharing Polman and Winston's words regarding the urgency of this time in history.

"We face existential issues. Will things get worse or better? It's in our hands. The solutions to our decades long global crises - climate change, biodiversity loss, inequality, the racial divide, and poverty among others- lie in empathy and compassion, in systems thinking, and collective association. We can choose the direction we go and what kind of world we create. We can have a net positive impact on all around us and build a place where people give a lot but also receive a lot in return. We have the tools to make enormous progress on everything that ails us. We can eliminate dire poverty, we can decarbonize, we can protect land and species.

We will choose our destiny together. We're asking for more trust, more courage, more humanity. Do you care? Do you have the willpower? Can you find the moral leadership to do what we must? If you join us in this most critical journey to net positive, you may open yourself up to criticism. You'll make mistakes. But the rewards are enormous, for you, for your business - which will thrive in a whole new way- and for all of us living together on this spinning, imperfect ball."

Working From Home - a productivity re-evaluation

John Heap

Abstract
During the COVID-19 pandemic and the various 'lockdowns' that resulted from it, there was an enforced trend towards working from home. This proved popular with employees who valued the flexibility, and the lack of commute but a number of firms/employers voiced concerns about negative impact on productivity. Unfortunately, there is little hard data to show the impact of working from home on individual or organisational productivity; much of the literature and commentary is based on survey data or anecdotal evidence. This paper explores the productivity impacts of working from home and seeks to identify evidence based on measured data rather than personal reflection but remains cautious about generalising in the light of evidence from qualitative studies which suggest that there are clear benefits accruing from working from home. The paper then goes on to suggest ways in which organisations should react to the evidence. The conclusion is that approaching working from home in a positive manner can help create competitive advantage and attract new talent.

Introduction
The pandemic did not start the working from home (WFH) phenomenon, but it certainly accelerated what was a slow-growing trend and brought it into the mainstream. For obvious reasons, when the edict is to always maintain specific distances between people, crowded workplaces are not helpful. Most forms had workspaces and working arrangements that were impossible to maintain within COVID-19 constraints and restrictions.

Firms were swift to see that WFH was the obvious solution to complying with those constraints and restrictions whilst maintaining some sort of workflow within the organisation. Luckily there was already software available to support remote communication - both synchronous and asynchronous …. though more tools emerged as the pandemic progressed.

Of course, only certain jobs are suitable for remote working - principally those centred around administrative and professional support activities where those activities can be carried out with only a computer and access, via the Internet or company Intranet, to company data and communication tools. Australian census data from 2016 shows that approximately 35% of workers had jobs that were amenable to working from home. (Productivity Commission Research Paper, September 2021).

Of course, the fact that many jobs are not suitable for home working means the productivity effects of the pandemic are wider than simply the effects of home working. For example, R&D and innovation activities are difficult to replicate remotely and, if the pandemic had continued over a longer period, this could have had a significant effect on longer-term productivity (Escudero & Kleinman, 2022).

Many employees reacted favourably to being asked to work from home. They valued the lack of commute and the increased flexibility, especially as many had other problems caused by the pandemic as, for example, schools were closed and childcare became a priority. The main negative impact most cited by those working from home is the increased feeling of isolation. (For most people, this was exacerbated by the imposed isolation of 'lockdowns' and 'social distancing.)

Interestingly, though many people's first thoughts were that working from home might add distractions (of domestic life and family), a number of surveys have suggested that many of those working from home found such distractions to be fewer than 'normal', office-based distractions such as telephone calls and chats with colleagues, though the absence of

such 'distractions' does seem to increase feelings of isolation.

Where is the evidence relating to productivity?

Galanti et al (2021) argue that social isolation is significantly and negatively associated with working from home outcomes concerning job productivity and engagement and positively associated with working from home stress-related levels. Thus, WFH was seen to both reduce productivity and increase the stress levels of the workers.

Galanti et al (2021) also posit that autonomy (the ability to self-manage work tasks and schedules) positively associates with productivity and engagement but negatively with stress experienced when working from home.

This reinforces the view that the link between WFH and productivity is not a simple, straightforward issue - especially since productivity is itself a complex and sophisticated phenomenon.

During the pandemic, employees settled into a pattern of working and meeting other commitments, which suited their current pandemic-defined lifestyle and were grateful to still have their regular salary. The fact that many of them had to supply their own technology - laptop, mobile phone and Internet connectivity - did not seem to deter them. In fact, US workers invested an average of 15 hours of time and $560 to upgrade their home work spaces, equivalent in aggregate terms to an estimated 0.7 percent of annual GDP (NBER Working Paper, 2021)

They also found out that they could take advantage of tax relief for appropriate expenses associated with setting up a home office and working from home. For workers who could satisfactorily perform their duties remotely, the advantages generally outweighed the disadvantages and minor inconveniences.

Working from home during the pandemic proved so popular that post-pandemic, we are seeing many, formal experiments and trials of structured forms of home working and of hybrid working, at the request of employees, where employees commit to a set number of days or hours in the office. Since so many of them have reported no loss of productivity, they fail to see why working from home is not a simple, long-term choice

What is the motivation behind increased working from home?

Many workers simply want to maintain the advantages they discovered during the enforced working from home of the pandemic - the lack of commute and the increased flexibility, especially parents who might be able to lower childcare costs.

Firms can have several reasons to allow or promote working from home for their employees. They may see the opportunity to reduce the size of offices and reduce property, and associated, costs.

Do employers have concerns about allowing working from home?

A number of employers do have concerns. Perhaps the chief worry is that workers who are separated from their supervisors or managers may be prone to 'slacking' or to making errors (though this perhaps says more about the supervisors and managers and their management style than it does about the workers).

The other main concern, and one I share in my uninformed world view, is that the lack of serendipitous interactions and knowledge-sharing, can negatively impact on the cross-pollenisation of ideas that leads to creativity and innovation. It seems inherently more difficult to collaborate at a distance.
More niche and more specialised concerns relate to the potential health and safety or well-being risks that may

accompany working from home - the use of unergonomic furniture and equipment, inadequate lighting, etc. The legal and regulatory responsibilities of employers are not entirely clear.

Does working from home affect productivity?

The evidence from Galanti et al does suggest that working from home has a negative impact on productivity. However, this is not a simple question - or answer. Many organisations, and many individuals who work from home, or have worked, from home, have made claims that it improves their productivity. This is not surprising since employees who value home-based working for the flexibility it provides, have a vested interest in demonstrating, or suggesting, that their performance does not decline as a result of the move from office-based to home-based working.

A number of organisations have made claims that productivity suffers when a significant proportion of the workforce works from home.

The problem is that the discussion becomes a series of claim and counter claim with little, if any, firm evidence.

For example, in a recent look at websites reporting on the productivity effects of a move to working from home, it was reported (Globalization - Partners website, 2022) that. "Evidence has shown that remote workers, in fact, thrive at home in contrast to an office environment."

However further reading shows that the 'evidence' for this statement is that "A survey by Flexjobs of more than 2,100 people who worked remotely during the pandemic found that?51 percent report being more productive working from home". As we suggested above, "Well they would, wouldn't they?" and 51 per cent is not exactly an overwhelming majority.

Indeed, I have made such claims before (from the other point of view), in blog posts, based on my general productivity experience. My general hypothesis has been that working from home might reduce productivity for the individual (though I would readily accept that it might be a neutral effect) but, almost certainly, reduces the productivity and creativity of the organisation, as an effect of the reduced communication and reduced 'accidental collaboration' that results from the lack of contact between employees both formally and informally compared to in-office working.

This paper set out to identify some 'harder' evidence of the effects of working from home on productivity and did find some such evidence. If evidence does exist of a productivity effect (positive or negative), it would be particularly useful as the COVID pandemic was, by definition, a global phenomenon and evidence may be available to suggest the generic nature of any findings, or, conversely, specific regional or cultural differences.

Gibbs et al (2021) use personnel and analytics data from over 10,000 skilled professionals at a large Asian IT services company (over a period of 17 months), using data from staff working both from home and from the office to make direct comparison possible. The staff involved received no performance-related pay or bonus, so remuneration should have had no effect on performance or on the manipulation or 'gaming' of the performance measurement system.

Their main finding shows that productivity fell between 8 and 19%, as a result of staff working longer hours (including outside of 'normal office hours') to produce a slight decline in output (as measured by each employee's primary performance measure).

Employees with children at home increased their working hours more and had a larger decline in productivity than those without children.
The productivity of women declined more than that of men, but the researchers had no clear evidence as to why this was,

suggesting that it might be due to increased pressures placed on women in a domestic setting whilst working from home.

Output was more likely to decline for employees with a shorter company tenure and the researchers speculate that employees who are more familiar with, and adapted to, the culture and processes of the firm are better able to perform when working from home, where there is no colleague at the next desk for quick help or advice.

Perhaps unsurprisingly, the time spent on communication and coordination activities (including online meetings) increased, while uninterrupted work hours shrank considerably.

Employees communicated with fewer individuals and business units, both inside and outside the firm.

Importantly, the effects on working time and productivity began immediately as employees moved to home working; they did not change gradually as the pandemic developed in nature or in magnitude.

Bloom et al (Bloom et al, 2020) researched the productivity impacts of COVID-19 in the UK and USA (though they claim that their findings are more widely applicable). They found that total factor productivity (TFP) fell by up to 5% during 2020-21. Of course, they were looking at the impact of COVID-19 rather than specifically working from home, but perhaps the spread of COVID-19 acts as a proxy measure for the spread of working from home.

What are the implications of the findings of this paper?

Though employers may feel that a return to office-based working is necessary to recover pre-pandemic levels of productivity and economic performance, the preferences and perceptions of employees may force these employers to moderate their approach to include at least some degree of working from home and various forms of hybrid working may emerge as permanent working arrangements.

Employers will then have to maximise the productivity - and minimise any perceived lack of collaboration and creativity - of selected working arrangements by providing appropriate and effective communication channels and processes (especially those that might come nearer to providing the 'richer' communication provided by face-to-face contact), equipment (and perhaps furniture) for employee home offices, training, coaching and mentoring processes.

The 'experiments' with WFH during the pandemic have given organisations the chance to study the effects of such approaches to home and remote working, and, hopefully, to think about how such approaches might enable them to extend their talent pool to potential employees outside of their commuting range, even in other countries. This could facilitate other approaches to work organisation, such as the introduction of open innovation (Chesbrough, 2017)

If employees want to keep working from home (for at least some of their time) post-pandemic, employers should create a WFH policy against which any request for home working can be assessed and considered. The policy will identify who can work from home, under what circumstances, and it will set any limits on home or hybrid working. It will describe how requests will be assessed and how decisions will be made - and, of course, it will conform to any national or industry-based regulation or guidance. The policy should lay down clearly the expectations on, and responsibilities of, employees when working from home. Employee contracts of employment will need to be checked to see if they need amending in light of the WFH policy.

Firms may retain (possibly smaller) offices as gathering places (for social interactions, meetings, and training), rather than the traditional process and task-driven spaces of the past. This will require thoughtful re-design of the spaces to provide more 'social' spaces, perhaps surrounded by shared and 'hot desking' workspaces. The office/workspace will have less time to carry out its role of connecting an employee to the company and to fellow workers, so it has to perform

this role more efficiently.

Because communication is very important, the policy should spell out working hours (in total and in terms of 'availability hours' when employees should be easily contactable via company communication channels. Existing policies relating to the use of these channels may need to be reviewed and revised. Similarly policy and practice relating to IT support and IT/online security may need updating.

For employees who are expected to have video calls with customers or other key stakeholders, it may be necessary to establish a dress code.

It is possible to search online for a templated WFH policy to provide a basis for your thinking and eventual policy.

Some of this requires changes on behalf of the organisation, which should be considered as the WFH policy is developed. It also requires the development of specific skills, competencies and attitudes on behalf of employees so they can fully take advantage of new communication skills, new technologies and new forms of supervision and management. It is much more effective to make the changes in readiness of a move to WFH rather than as a result of enforced WFH resulting from another pandemic or other disaster.

(As a side thought, the changes in traffic patterns that are likely to result from a significant portion of the workforce working from home have clear implications for transport services and retailers who normally rely on office workers for a significant part of their income.)

Though the impact of WFH on productivity is not a simple issue, this paper suggests there is hard evidence which suggests that impact is likely to be negative. However there is also considerable, softer evidence to suggest that many employees value the opportunity to work from home and post-pandemic, wish to continue the practice for at least some of their working hours. Employers may be able to use this satisfaction to increase employee engagement and productivity. Separately, they may be able to use a positive attitude towards WFH as an attractor for talented individuals from a wider catchment area than would apply for those applying for employment which required physical attendance.

Employers should therefore consider WFH as an opportunity to improve the well-being of the workers and to increase organisational productivity. Approaching WFH in a positive manner can help create competitive advantage and attract new talent.

References

Working from Home,
The Australian Government's Productivity Commission Research Paper 2021,
Why Working from Home Will Stick
Jose Maria Barrero, Nicholas Bloom, Steven J Davis
National Bureau of Economic Research Working Paper No 28731 Aprikl, 2021

The Impact of Covid-19 on Productivity
Nicholas Bloom, Philip Bunn, Paul Mizen, Pawel Smietanka, and Gregory Thwaites
National Bureau of Economic Research Working Paper No. 28233 December 2020

Work from Home & Productivity: Evidence from Personnel & Analytics Data on IT Professionals
Michael Gibbs, Friederike Mengel, and Christoph Siemro
Becker Friedman Institute, University of Chicago, Working Paper 2021-56 July 2021

Work From Home During the COVID-19 Outbreak:
The Impact on Employees' Remote Work Productivity, Engagement, and Stress
Galanti, Teresa; Guidetti, Gloria; Mazzei, Elisabetta; Zappalà, Salvatore; Toscano, Ferdinando
Journal of Occupational and Environmental Medicine: July 2021 - Volume 63 - Issue 7

The Future of Open Innovation
Henry Chesbrough (2017)
Research-Technology Management, 60:1, 35-38

How did working from home during Covid-19 impact productivity
Cristian Escudero & Mark Kleinman
The Policy Institute, King's College, London (2022)

Globalization - Partners website
https://www.globalization-partners.com/blog/remote-vs-office
-productivity/?utm_source=Adwords&utm_medium=cpc&utm_campaign=Search_|_UK_
-_Dynamic_[en]&utm_term=&gclid=CjwKCAjw79iaBhAJEiwAPYwoCN2NY6Cy_
-J55FZGfS8DTx0Dpg_tVjZja9qzxP4RG8U7DHRBsP99VxoC2HoQAvD_BwE
(accessed 24th October, 2022)

WAPS Knwledge Sharing Forum - 5 Mental Health And Productivity

Dr Sunil Abrol and Remi Dairo

WAPS fifth Knowledge Sharing Forum was held on November,16,2023 on the theme " Mental Health and Productivity ".

Since the COVID 19 , mental Health challenges have been a topic of high essence as it has multiple implications on people , Schools, work and Society at large.When we talk about Mental Health we talk about mind.

Speakers for the forum were :

1. Dr Harvey Schipper , Professor of Medicine, University of Toronto, Key note Speaker.
2. Ms. Daryl Chow , Lead Agile Coach, Hong Kong
3. Dr Joanne Frederick , Professor of Counselling, USA
4. Ms. Elyse Schipper, Executive Director, Family Services, Ottawa, Canada.

Dr Harvey Schipper in his opening remarks highlighted the importance of Mental Health in Society. He brought out that a study during second year of COVID 19 pandemic carried out by a psychologist found that 30% or more between the age group 15-30 experienced major mental consequences of pandemic.

The points made by panelists were as follows :

Ms. Daryl Chow :

1. From a research survey done in Hong Kong, 1 in 7 people develop common mental disorder in their life, such as anxiety, depression. Work place being top stressor.
2. Pandemic reshaped the whole consumer behavior , habits and life style.Business environment has become more volatile.
3. Use of ADKAR (Awareness, Desire, Knowledge. Agility , Reinforcement) model and multiple means of communication (executive forum, leadership workshops, fire side chats, newsletters) are being used to manage change.
4. With this approach every staff can be listened to and everyone in the team can contribute to shaping the team.
5. Approach has helped in boosting innovation, continued improvement, leadership and high staff quality.
6. People are key to productivity. We need to create right work environment in order to achieve business goals. Work place is common to all.

Dr Joanne Frederick :

1. Mental Health is one's ability to manage the psychological, emotional, spiritual and Social wellbeing.
2. Productivity is the state of quality of producing outcomes.
3. If one has poor mental health , it means one does not have strong ability to deal with issues like depression, anxiety and burn out thus decreasing one's motivation and productivity.

4. Strategies for managing Mental Health :

a) Figure out culturally what is appropriate care for mental health.
b) Seek professional help for talking to and medication.
c) Read self help books.
d) Channelizing your thoughts.
e) Reading inspirational books for affirmation.
f) Better manage your schedule.
g) Decrease procrastination.

Ms. Elyse Schipper :

1. Mental Health challenges are common.
2. It is to do with overall perspective of different parts of one's life, coping, managing and optimizing them.
3. Ealy and timely treatment helps.
4. Pine River Institute follows the theory centered around rooting out the cause and dealing with it rather than cutting the symptoms as the latter is short term.
5. Resources are channelized towards helping the youth and their family members for a sustained period in order to fully address underlying challenges and create systems that support healthy life moving forward.
6. Care givers play pivotal role in influencing the outcomes .
7. Parents have a major role in the therapy as they know the baseline of the person.
8. Parents also have a lot at stake and are most motivated for the job of getting their kids get well.
9. Parents need to be educated , empowered and supported in their care giving role.
10. Family Services, Ottawa, sees it in a bigger picture of a system that supports and challenges a person's ability to be okay by incorporating the person's overall life style.
11. Best treatment for mental health is to address all areas of a person that are either barriers or enablers to well being.
12. Raise your expectations from them to raise them.
13. Mental Health care needs long term funding .
14. Maximize underused resources.
15. Focus on Mental Health would help increase both individual and family productivity.

Contributors to this issue of IJPS

1. **Aldo Manos** , Professor of Envioronmental Diplomacy, Trieste University, **Italy**

2. **Hong Wu** , School of Computer and Technology, Hankou University, **China**

3. **Dr Joanne Frederick** , George Mason University, **USA**
   askdrjoanne@yahoo.com

4. **John Heap** , Research Fellow, Institute of Productivity, **UK**
   john@instituteofproductivity.com

5. **Remi Dairo**, Director, Institute of Productivity and Innovation, **Nigeria**
   remidairo@gmail.com

6. **Dr Sunil Abrol**, President, Institute for Consultancy and Productivity Research, **India**
   sunilabrol@rediffmail.com

7. **Thomas C Tuttle**, Past President, World Academy of Productivity Science,
   tctuttle@aol.com

8. **Ufuk Kaya** , ASO model factory Director, **Turkey**
   ufuk.kaya@modelfabrika.org

9. **Yuheng Ren**, Vice Dean, School of Business Economics, Europeon Union University, **China**, Hoture@126.com

WORLD
CONFEDERATION OF
PRODUCTIVITY
SCIENCE

International Journal of Productivity Science (IJPS)

A Quarterly WAPS Publication

The International Journal of Productivity Science (IJPS) is a quarterly WAPS Publication focuses on SEE (Social, Environmental and Economic) Productivity. It is a platform for productivity researchers and practitioners to share their views and foster discussion.

Guidelines for Authors:

1. Paper submitted is required to be related to Productivity in any sector or area of operation (Social, Environmental, Economic).
2. Paper submitted should be in the English language.
3. Paper should be original writing bases on authentic events, data, case studies, facts, etc.
4. Paper length should be between 2,500-3,000 words, abstract should be between 250-300 words.
5. Contents of the paper should be annotated.
6. Author should give appropriate acknowledgment and references to recoginze sources of information, data, etc.
7. Manuscript should be in double space, typed in Times New Roman font, with font size 12, or Arial, font size 11, in MS Word file.
8. There should be a separate page for Title, Name of Author(s), Institutional Affiliation, email ID, etc.
9. Author will be responsible for conforming to IPR requirements and regulations and disputes if any, arising out of the submitted paper will be his/her responsibility.
10. Paper would be Peer Reviewed before acceptance for publication.
11. Papers published in IJPS would be IPR of IJPS.
12. All papers should be submitted to the President to WAPS: secretariat@waps.info

Dr. Sunil ABROL
President, Institute for Consultancy
and Productivity Research,
INDIA
sunilabrol@rediffmail.com

Ms. Anita TANG
Managing Director,
Royal Roots Global Inc.
USA
atang@rroots.net

World Academy of Productivity Science (WAPS)
Membership
Join Apex International Professional Body In Productivity

About WAPS:

WAPS (www.waps.info) is the academic Division of World Confederation of Productivity Science (WCPS). WCPS(www.wcps.info) is apex international body engaged in promotion and development of Productivity Movement across Globe. WAPS secretariat is currently in China and WCPS secretariat is currently in Canada.

Management : WAPS is managed by a WAPS Board comprising of President, Vice Presidents and Advisors. Committees for various activities and projects are constituted by WAPS Board from time to time.

Activities : WAPS is engaged in Publications, Research, Training and Capacity Building, Round Tables, Webinars etc. for promotion of Productivity Movement.Current WAPS activities include:

1. International Journal of Productivity Science (IJPS) : WAPS produces an E journal for the benefit of members annually with contributions from Fellow, members and other professionals.

2. Knowledge Sharing Forum : WAPS organizing every quarter a Webinar based discussion on themes of relevance with speakers across Globe.

3. Fellow Induction : Eminent productivity professionals are inducted as WAPS Fellows by WAPS Board through a nomination and selection process.

Membership Benefits:
1. Membership of Global professional body in Productivity
2. Get free soft copy of IJPS , WAPS E journal
3. Opportunity for professional development and learning
4. Networking with Global productivity professionals
5. Participate in WAPS/WCPS events at special terms
6. Speak at WAPS/WCPS Forums/ conferences
7. Get inducted as prestigious WAPS Fellow (an honorary recognition)
8. Contribute papers in IJPS as author
9. Opportunity to move to WAPS / WCPS management roles
10. Opportunity to get involved in WAPS/WCPS projects

Membership Fee :

Individual Professionals	:	USD 25 (Annual) , USD 300 (Life Time)
Organizations	:	USD 250 (Annual) , USD 3000 (Life Time)

Mode of Payment :

USA /Europe/ Africa : Paypal		
China	:	We Chat Pay / Alipay
India	:	Google Pay

Contact : For any information contact WAPS secretariat :

secretariat@waps.info

IJPS

INTERNATIONAL JOURNAL OF PRODUCTIVITY SCIENCE
WORLD ACADEMY OF PRODUCTIVITY SCIENCE
Email : secretariat@waps.info