

COVID-19 Pandemic Impact on a Global Liner Shipping Company Employee Work Digitalization

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ABSTRACT: The SARS-CoV-2 pandemic that began to spread across the world in 2020 still poses a threat not only to human life and health, but also to the global economy. This situation led to the breakdown of many supply chains, and this could have resulted in the collapse of the international exchange of goods. The COVID-19 affected the shipping industries development: shipping operators, port operators, government authorities, shippers, seafarers, passengers, supply chain operators and others. The paper presents the impact of the pandemic on the working model throughout the results of a survey conducted among the office employees of a shipowner company being one of the leaders in the maritime container transport sector. It aimed to investigate the effects of the pandemic as regards the management and organisation processes in the light of digital transformation within this enterprise. Employees were asked to express their opinion on the advantages and disadvantages of the remote work and its influence on the way they performed their duties. At the beginning, employees were most affected by the lack of direct contact with colleagues. At the same time, many of them declared that after the end of the pandemic, they would like to combine the remote and office work. The hypothesis of this research reads as follows: as a reaction to the COVID-19 pandemic, a new working model has been created allowing the continuity and the efficiency of operations in the maritime container sector, therefore ensuring the resilience within the global supply chains. The results prove that the transition of office workers to remote digitalised working mode allowed the company to continue operating efficiently during the first phase of the pandemic. Actually, this new mode, which was initially meant to be only a temporary solution, has become the dominant form or a combination with the traditional mode of work, creating a kind of hybrid version working model in the company.

1 INTRODUCTION

The first cases of the SARS-CoV-2 virus, which directly causes COVID-19 respiratory disease, were reported in the city of Wuhan in the People's Republic of China. On the 30. January 2020 WHO declared a public health emergency of international concern in connection with the spreading of COVID-19 epidemic. Nowadays, when the globalization phenomenon becomes present almost all over the world, the possibility of free movement of people has led to an increase in the range

of impact of the new virus, which like influenza, smallpox or angina, is transmitted by droplets (through sneezing and coughing). As a result, the epidemic turned into a pandemic, as its range extended beyond China and the Asian continent and covered almost all the continents. Vaccinations aimed at reducing the number of new cases of COVID-19, although they do not fully guarantee that the vaccinated person will not be able to carry the SARS-CoV-2 virus. As for the treatment of this disease, there is as yet no approved treatment for it, only fighting off

the symptoms and supporting the functioning of the body.

Numerous shocks test the resilience and adaptability of the shipping industry and container sector itself. The COVID-19 affected the shipping industries development: shipping operators, port operators, government authorities, shippers, seafarers, passengers, supply chain operators and others. It had an impact on the world trade, because it contributed to the breakdown of many supply chains, which was caused by downtime or even production stoppages (fig. 1).

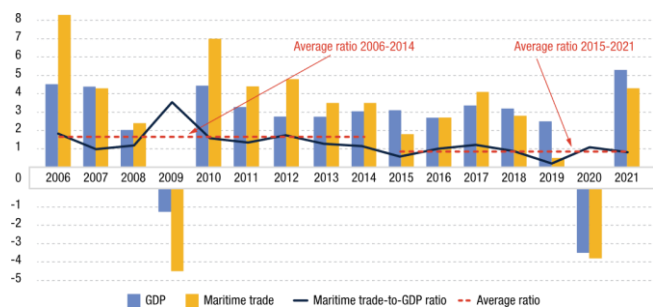


Figure 1 International maritime trade, world gross domestic product (GDP) and maritime trade-to-GDP ratio, 2006 to 2021 (percentage annual change and ratio)

Source: <https://unctad.org/news/maritime-trade-weather-covid-19-storm-faces-far-reaching-knock-effects>, 2022-11-10.

At that time, it became even clearer how important transport is to maintaining the international flow of goods. The continued functioning of maritime transport was particularly important, as it is used in the flow of approx. 80% of cargo in the entire world trade by volume and more than 70% by value [1].

Therefore, the operation of shipowners transporting containers [2], which constitute the third largest cargo group handled by sea transport [3], is also important. The activities of such a shipowner can be divided into two separate but closely related aspects. One of them is the physical transport of cargo, and the other is the handling of these services from the organizational side, i.e. office work. Both the work that the shipowner performs on ships and in offices was affected by the pandemic and the related restrictions. However, in order to maintain the circulation of goods during a pandemic, transport service providers must not be restricted so that they cannot provide their services [4], [5].

The changes observed and the strategic behavior of the market players involved reveal that further adaptation mechanisms, such as slow steaming, economies of scale, and capacity management, have been applied differently between the financial crisis and COVID-19, resulting in different outcomes. For an external shock such as COVID-19, impacts are the outcome of how ports and the shipping industry fit within complex supply chains [6] and the cargo composition handled by ports [7]–[9].

To face such difficult challenges [10], management policies must take into account the infrastructure, work and engagement sectors required to be fast and appropriate. It is crucial to apply crisis management, so that the main things that must be prioritized can be found. Among them we can find cost optimization, implementation of digital technology and the use of

data as a direct business enabler, and also innovative solutions, such as unmanned aerial system (UAS) technology reducing operational costs, human risk, environmental impact, and delivery time [11]–[13].

At the same time, seaports need to maintain resilience through the pandemic by building risk management plans and expanding the circle of cooperation regionally and globally, not only within the port, but also including the maritime supply chains [14]. The research study results conducted in the Polish seaports revealed that the terminals extent of engagement and tactical decisions related to the pandemic were depended on the type of terminal (universal or specialised) and its main function playe within a supply chain [15]. As regards the shipping management perspective, the industry experienced issues such as crew changing, trade contraction and the expiration of shipping certificates [16].

The lessons learned from the second pandemic wave indicate that companies are expected to begin searching for a more diversified supplier base in the near term, thus looking to build a versatile, but cost-effective, supply chain. Shifting supply chains nearby, decreasing the suppliers base, increasing the digitalization of supply chains are essential tactics companies have to start committing to [17].

One should also remember about socio-economic COVID-19 consequences, threat to the existence and to the physical and mental health, especially during the first phase of the pandemic [18], [19]. Also, the key to success may be an organizational elasticity as a framework to manage the long-term organizational impact of the current pandemic [20]. According to some research results, the three-dimensional nature of employee well-being may include : workplace relationships, health, and work–life balance [21].

A framework for operations and supply chain management at the times of COVID-19 pandemic has been suggested, including six perspectives, namely: adaptation, digitalization, preparedness, recovery, ripple effect, and sustainability [22]. Still, there is a necessity of quick response to crisis situations and searching for innovative ways to overcome the operational and financial challenges. The results of current research pointed also out the critical problem with the lack of the so-called “Plan B”, helping supply chains quickly react on disruptions occurring in the flows [23]–[27].

Thus, there is still a need for research concerning theoretical and practical implications for improving employee's performance through the digitalization of service organizations and answering the question whether the coronavirus pandemic is the cause of the crisis or rather a turning point and a unique opportunity to develop in a highly competitive environment [28], [29]. Covid-19 has indeed accelerated the society's digital transformation towards Industry 4.0. Some other research show that COVID-19 pandemic helped to develop the awareness about the climate change by demonstrating how the decrease in economic activity can have a profound effect on cutting CO2 emissions. At the same time, it resulted in an enhanced family life and interpersonal relations contributing to the quality of human capital and the level of happiness [30]–[32]. Also, recent studies concentrate on the relationship between

tourism development and the decrease of pollution levels [33].

When considering the effects of the Covid-19 on the size of the enterprises, SMEs have more experienced more difficulties than bigger companies, due to less customer demand for goods and services, limited resources and also problems with digitalization. In this respect, it is interesting to investigate the opportunities in digital transformation from the perspective of startups and traditional organisations [34]–[38]. Other research focus on the effects of internal marketing orientation on job satisfaction, and the effects of job satisfaction on job performance and counterproductive work behaviors. The results of a study carried out in Ukraine show that the spread of the COVID-19 pandemic and quarantine restrictions stimulated the growth of demand for digital technologies to meet the communication, professional, consumer and economic needs of the people, contributed to the spread of new non-standard forms of employment using information and communication technologies. In the end, for some it was considered a long-overdue push for digitalisation, for others it revealed how much their work was related to printed matter.

Obviously, both sides: employers and employees with no previous experience of telework have faced the advantages and drawbacks of this work arrangement. According to latest research, modification of legal and contractual regulations is the only factor that has a weak and insignificant influence on telework. Still, there is a need of time and resources to meeting the new challenges created by such fundamental changes and supporting the displaced workers and monitoring the new opportunities in the labor market, but most importantly, it also requires new leadership concepts, paying special attention to young workers [39], and individual support for every single employee in the light of potential precariousness of the workforce [40]–[46]. Without any doubt, New Normal offers a new playing field which, as some researchers claim (Gruenwald, 2020), is ‘still not level and tilts like the old one but it can mean a new start for education and the economy in a more local than global society’ [47].

There is evidence that people value digital tools and were able to find methods of effective and efficient collaboration in distant work environments [48]. What is more, employers and HR personnel/Consultants have been challenged to re-think, re-design and think ‘out of the box’ and invent the best practices for running their businesses and industries, as well as re-define roles during this turbulence [49]. At the same time, despite the investments which the European countries have made in recent years in digital infrastructure, there are large disparities in terms of adaptability to telework [50].

Also, in the COVID-19 time, several tendencies are noted: digitalization, changing the model of mobility, changing consumer buying habits, infodemic, increased attention to one's health, hygiene and healthy lifestyle, changes in interpersonal behavior [51]. For example, according to some research (Butkaliuk, 2021), ‘having considered the impact of the current process of automation, robotization and digitalization of the global economy, without changing the socio-economic and political configuration of the structure of the modern world, the potentially high

utility of the latest achievements of science and technology will be significantly limited and subordinated mainly to the economic interests of capital owners, and will not work for the benefit of all humanity and social progress’ [52]. One should also be aware that digital transformation is based on five different areas: customers, competition, value, innovation and data [53]. At the same time, aspects of surveillance and privacy gain in importance with increased digital usage.

One of the study revealed that remote working has been used to mitigate the negative impact of the Covid-19 pandemic on the productivity of organizations and it was also revealed that the HR managers have undergone a major change of role in maximizing productivity, engagement, collaboration, satisfaction level and work-life balance of the employees. As the author claims (Roychowdhury, 2021), it was found that there exists a significant association between the preference of remote working across gender [54]. Also, problems of digitalization have been exacerbated and must be further understood and ameliorated in the post-COVID world [23]–[27]. Thus, companies will face the challenge of combining virtual and physical working while offering employees an appropriate working infrastructure. However, the future consequences for work design remain unclear, as many companies are still in a state of instability [55]. It will be also interesting to follow how AI-based algorithms are used to direct, evaluate and discipline workers, and how workers respond to these forms of algorithm management [56].

Meanwhile, ships still have to sail and shipowners must ensure that these ships can be manned. The situation is a bit different in the case of office work, without which the functioning of the enterprise would also be impossible. The introduced restrictions on maintaining social distance and limiting movement forced entrepreneurs to close their offices, which were places where large numbers of people gathered on a daily basis. Therefore, employees had to switch to the so-called remote work, also known as home office. An example here is a maritime container transport company “X”. It can be assumed that currently all of its’ offices do not follow the same rules of work organization, depending on the epidemic situation in a given country. However, the transition to remote work of a large number of employees was certainly a challenge for the company, especially since the success of this operation depended on its future.

2 RESEARCH METHODS

The aim of the paper was to investigate the effects of the pandemic as regards management and organisation processes in the light of digital transformation taking as a case study a global liner shipping company. The hypothesis of this research reads as follows: as a reaction to the COVID-19 pandemic, a new working model has been created allowing the continuity and the efficiency of operations in the maritime container sector, therefore ensuring the resilience within the global supply chains.

In particular, the purpose of quantitative study carried out using a questionnaire focused on finding

out in particular the advantages and disadvantages as well as the opinions of the company's office employees about a new working model: remote work. The research problem has been therefore the answer to the question of how well company "X" has adapted to work in pandemic conditions.

With 253 vessels, 11.9 million TEU transport volume, around 14,300 employees in more than 400 offices in 137 countries, this enterprise is a leading global liner shipping company. It offers a fleet with a Vessel Capacity of 1.8 million TEU, as well as a Container Capacity of 3.0 million TEU including one of the world's largest and most modern reefer container fleets. A total of 126 liner services worldwide ensure fast and reliable connections between more than 600 ports on all the continents. The company belongs to the leading ocean carriers for the trades Transatlantic, Middle East, Latin America and Intra-America.

The research sample consisted of the employees of this company, who usually work in the office located in the city of Gdańsk in Poland. The survey has been carried out from 22. February 2021 to 01. March .2021 and a total of 124 respondents reacted, which is a representative research sample of this office.

The questionnaire was prepared via the Google Survey tool and consisted of fifteen questions. The respondents also had the opportunity to share their opinions and thoughts on the pandemic and remote work by entering a comment into a text field specially prepared for this purpose. Questions regarding the age and gender of the respondent were placed at the end of the questionnaire, but the answers were to be analysed first to facilitate the subsequent interpretation of the other results.

The largest group were people aged 26 to 50 (73% of total), which may indicate that the workforce is relatively young. For the employer, a factor more important than the experience, may be the ability to quickly adapt to changes which is typical of younger employees. Out of the 124 respondents, 59% were women and 41% were men. Women have been more numerous than men in the 18-25 years old group (9% of total) and 26-50 age groups and in the group for more than 50 years old (18% of total) men slightly dominate. A similar relationship can be read by analysing the answers to the question about experience at company "X", and they are presented in Figure 2.

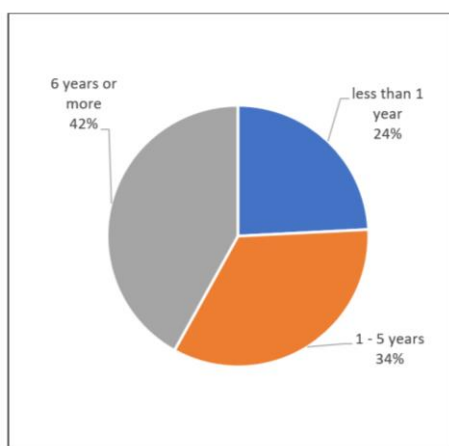


Figure 2. Respondents' period of employment in the company "X"
Source: own elaboration.

Almost a quarter of all respondents have been working in the aforementioned enterprise for less than a year, which proves that in a relatively short time the number of office employees increased by approx. 30%. It should also be added that these employees were hired in the period from March 2020 to March 2021. It was the time when the COVID-19 pandemic was spreading around the world, but it seems like it did not thwart the plan to hire new employees.

The fact that the group with 6 or more years of work experience is the most numerous may indicate that, contrary to the interpretation presented above, the experience of employees is important to the employer. Moreover, the largest age group, which is 26 - 50 years of age, includes a big number of people with relatively long work experience, and it should also be taken into account that these respondents also have an experience gained in previous jobs.

3 RESULTS

A factor analysis was performed in regards to all the questions describing the perceived advantages and disadvantages of remote work during the COVID-19 pandemic. While we assumed that the general variability of these responses might be similar to each other, we wanted to verify whether there had been any underlying attitudes or beliefs, represented by latent variables (factors). Exploratory factor analysis (EFA) with an extraction by the principal components methods was chosen so as not to assume underlying data structure which would be necessary for confirmatory factor analysis or as a part of structural equation modelling. The Kaiser-Meyer-Olkin criterion of eigenvalues higher than 1 was assumed as the main criterion regarding the choice of the number of factors extracted (tab. 1).

Table 1. Factors extracted for the remote work scale

Variables	Factor 1	Factor 2
Use below scale to evaluate advantages of remote work (where "5" is the biggest advantage and "1" is the least important). [no need to move between the office and place of residence]	0.71	-0.08
Use below scale to evaluate advantages of remote work (where "5" is the biggest advantage and "1" is the least important). [better organization of the day]	0.87	-0.10
Use below scale to evaluate advantages of remote work (where "5" is the biggest advantage and "1" is the least important). [increased security]	0.56	-0.24
Use below scale to evaluate disadvantages of remote work (where "5" is the biggest disadvantage and "1" is the least important). [no direct contact with other employees]	-0.67	-0.05
Use below scale to evaluate disadvantages of remote work (where "5" is the biggest disadvantage and "1" is the least important). [lack of motivation to work at home]	-0.56	-0.53
Use below scale to evaluate disadvantages of remote work (where "5" is the biggest disadvantage and "1" is the least important). [higher utility costs (electricity, water, etc.)]	0.06	-0.88
Eigenvalue	2.35	1.13

Source: own elaboration.

Interestingly enough two factors were extracted. The first one groups the variability of almost all the statements which were agreed or disagreed upon by the respondents, i.e. the lack of need to move between the office and place of residence, the ability to better organise the day and increase security and on the other hand no direct contact with other employees or lack of motivation to work at home, as indicated by factor loading either higher than 0.55 or lower than -0.55. The disadvantages present a negative factor loadings while the advantages have a positive higher loading, which means that the stronger the advantages had been perceived by the respondent, the more likely he was also to strongly assess the disadvantages of remote working. The only statement which represented a different variability to the other six was the statement regarding the assessment of higher utility costs resulting from working at home. Its variability is the only one strongly represented in factor 2, as proven by a factor loading of -0.88. This possibly indicates that this was a concept without bigger consequences for the employees. Therefore factor 1 was taken from this moment on and treated as the representation of the strength of the perception of advantages and disadvantages of remote working and underwent further analysis.

The differences in the strength of perception of advantages and disadvantages were verified for a number of categorical variables using analysis of variance (ANOVA). One-way ANOVA was used, for every analysis Cochran, Hartley and Bartlett tests were applied to verify the homogeneity of variances. A critical level of 0.05 was assumed.

The first analysis was performed in regards to the position of an employee in the enterprise with a p-value for the ANOVA's F-test at <0.001. The advantages and disadvantages were statistically significantly differently perceived by two groups (as proven by Bonferonni post-hoc test) – students and directors perceived them milder, whereas regular employees and mid-level managers perceived significantly stronger.

This seems to be in line with the results regarding the time spent in the company (fig. 1). At a significance level of 0.028 for the F-test, people working in the company for a period longer than 6 months have much stronger feeling about advantages of working from home than the people working very shortly (1-3 months) and people working 4-6 months in the company.

The ANOVAs with the group division based on gender or the use of company's hardware in home turned out not to present statistically significant differences. P-values were higher than 0.1 in both cases. This partially contradicts previous research which stated that females have stronger feelings regarding remote working.

As expected, the differences in the perception turned out to be undoubtedly statistically significant ($p < 0.001$) in regards to the expectations for the structure of work after pandemic. People who expressed the desire to still work remotely or to combine remote work or office work had much stronger feelings about the advantages and disadvantages of remote work than people who expressed the desire to return to office work after the pandemic.

There were also strong significant differences regarding the use of a particular software in mobile work ($p = 0.02$), which might indicate differences in user experience, although in this case, the homogeneity tests indicated the necessity to reject the null hypotheses regarding homogenous variances, thus rendering the results of ANOVA debatable.

Lastly, three variables regarding the perception of the respondent of how effective the adaptation of the company to the pandemic situation was in terms of:

- communication and information flow,
- safety,
- hygiene and disinfection standards

were treated as a dependent variable. Main effects ANOVA was again applied with age, gender, position in the company and length of experience in the company being the categorical grouping factors (tab. 2).

Table 2. Results of the ANOVA – perception of adaptation

Variable	Communication and information flow		Safety		Hygiene	
	F	p	F	p	F	p
Age	0.142	0.94	0.338	0.677	0.285	0.845
Gender	1.332	0.283	0.34	0.778	0.032	0.846
Position in the company	4.324	0.292	0.73	0.639	0.53	0.891
Experience at the company	6.5	0.063	1.826	0.125	3.626	0.123

Source: own elaboration.

Interestingly enough, there were no significant differences in regards to either of the three dependent variables for all the factors. This might indicate that any variability in this respect is a consequence of other factors, possibly of more behavioural or attitudinal character.

4 CONCLUSIONS

The survey research results proved that the company "X" adjusted quite well to the New Normal in the time of the pandemic. The greatest advantage of remote work is the lack of need to move about, which saves time and money. The biggest disadvantage, in turn, is the lack of direct contact with other employees, which the employer tries to remedy by providing a new tool for internal communication. Employees can perform their work staying at home, thanks to the fact that the employer provides them with the necessary equipment and also technical assistance. The vast majority of respondents switched to home office when pandemic started, thanks to which it was possible to maintain greater security, and the employees themselves also agreed with this. Remote work is the greatest obstacle for managers and directors who, due to the lack of direct contact, are not able to manage their subordinates equally efficiently, but it can be concluded that the actions taken by the employer bring results.

Thanks to the new form of work, the shipowner can continue to provide services without interruptions or obstacles, and the home office itself gains in appreciation from employees. It happens that this new mode, which was initially meant to be only a

temporary solution in the company, has actually become the dominant form of work or combination with the traditional mode, creating a kind of hybrid version. In any case, the results of the study show that home office works well, although of course it does not suit everyone. However, possible improvements could be considered, especially in places indicated by the employees themselves, and then working from home could become even more efficient and comfortable.

While our study provides timely analysis, including insights and lessons learned [57], which can inform stakeholders on the future pathways, it also contributes to scholarly discussions by pointing out future research agendas that could guide further academic investigations [58]–[60]. What is more, likewise other research findings, such analysis may contribute to strengthening the awareness of COVID-19 and – as a consequence - reduce operational risk and in the end improve business performance for the maritime related industries and authorities [61].

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