



IJEAST

INTERNATIONAL JOURNAL
OF ENGINEERING APPLIED SCIENCE
AND TECHNOLOGY



VOLUME : 7 ISSUE : 06 Print / Issue Publication Date: 24-Dec-2022



ISSN : 2455-2143



DOI : 10.33564/IJEAST.2022.v07i06.011

Indexed In



WWW.IJEAST.COM

editor@ijeast.com



ASSESSING STRATEGIES IMPLEMENTED ON PRODUCTION FLOORS TO IMPROVE PRODUCTIVITY IN THE MIST OF COVID-19 IN GHANA.

Elijah Afeliga (PhD)
Sack Division, Fine Print Industries
Tema, Ghana

Abstract— Since Covid-19 emerged from China and started spreading globally with its adverse effect on economies, little research is done to ascertain the kind of strategies used on production floors particularly in Ghana, to survive its devastating effect.

Companies were randomly sampled and questionnaires administered to managers on production floors to answer. Data was then analyzed and concluded that changes were largely made on production floors to be able to keep the floor running in line with globally published literature that seeks to give guidance to survive on the production floor in the mist of covid-19 by increasing productivity whiles reducing cost of operations.

Keywords— Covid-19, production floor, quality management, schedule, maintenance

I. INTRODUCTION

One of the sections in factories highly hit by the devastating effect of Covid-19 is the production floor. Most production floor activities are largely semi-automated which demanded the physical presence of workers to operate the machines. Most factories in such nature have huge staff on the floor at any given time. Due to nature of operations, physical presence of staff is required. It was therefore devastating when Covid-19 started spreading globally which led to lockdowns. Lockdown meant that staff couldn't go to work as scheduled. This led to reduction on production output causing shortages of supplies globally. Companies which could not withstand the pressure either collapsed or changed strategies because of its devastating effect on income flows. Factories that were not initially hit by the lockdowns had to suffer the consequence of non-available of supplies. This research therefore seeks to assess strategies implemented on production floors to improve productivity in this era of new normal. This new knowledge will serve as a reference document for production floors operations in times of global crisis.

Economic outlook

Provisional gross domestic product (GDP) estimates from Ghana Statistical Services for 2020 showed a growth rate of 0.4 percent compared to 6.5 percent in 2019. The Agricultural sector recorded the highest growth rate of 7.4 percent, followed by Service (1.5%) and Industry (-3.6%) sectors. Comparing this growth rate with the previous years, manufacturing, which contributed 9.5% in 2017, 4.1% in 2018 and 6.3% in 2019, managed to add only 1.4% to the 2020 GDP when Covid-19 struck. The 2020 figure happens to be the second lowest since 2013 where the sector had a contraction.

In a paper compiled by Willem te Velde et al (2018), moving labour out of low-productivity agriculture and into higher-productivity manufacturing is crucial for structural change in Africa (McMillan et al., 2017). Expanding manufacturing production and exports, and increasing their sophistication, can drive industrialization and create much needed jobs. Indeed, export-led manufacturing is the only proven model to drive economic transformation and boost employment (Balchin et al., 2017) and Ghana is no exception. In fact, upon resumption of power in 2017, the government started implementing their one district one factory initiative with the aim of boosting up value addition.

When Covid-19 struck in the last quarter of 2019 and began to spread, globally, all sectors including the manufacturing sub-sector started experiencing some shocks and Ghana was no exception. The Covid-19 pandemic and its related nature of its fast spread came as a surprise to the globe which affected companies badly. In Woods and Kroma (2020) view, the effect of these issues and others had on companies was magnified by the speed of the pandemic's spread and the fact that the business community had little time to prepare. Alison Woods, Partner and co-head of Employment Law for CMS UK explained that they had to learn as they go along and deal with the pandemic's fall out and Ghana was no exception.

Reaction of companies globally

According to Raza (2020), since the striking of Covid-19 globally, manufacturers have seen multiple operational, social



and financial consequences, forcing them to rethink risk management and contingency plans, workforce safety protocols and new ways of working opportunities. Not only is it Covid-19, but according to Roblek et al. (2022), in the 21st century, the business environment is in a situation where rapid environmental changes, political aggravations, and the emergence of new technologies make it extremely difficult to predict future events, especially when using historical data that lose their relevance and validity (Gkeredakis et al. 2021), exposing the vulnerability of a global supply chain (Free & Hecimovic, 2021).

Raza (2020) explained that manufacturing teams and leaders have concentrated on solving the immediate challenges required to keep the business as stable as possible. To be able to achieve this, some of them have formed emergency response teams to gain a better understanding of their production demand changes, labour support changes and supply chain ecosystem constraints by attempting to re-commence work with a focus on keeping employees safe via social distancing tools and robots. Some are even pivoting their production lines to manufacture in-demand products it did not pre-pandemic.

Globalspec (2020) is emphatic that some manufacturers have adapted their workspace to continue operations amid the COVID-19 pandemic by pivoting their production lines to manufacture products in high demand but short supply. This has the two-fold benefit of keeping manufacturers in service while helping to fulfill critical supply chain shortages.

Also, with so many demands on manufacturers, large and small, manufacturers are increasingly turning to robots to keep employees safe through various proposed social distancing and industrial automation solutions.

After effect of Covid-19

In Kyanon (2021) blog, he discussed the current effects of the pandemic on demand on the supply chain, and what manufacturers can do to respond to the changes. Changes in demand in his view has led to two distinct consequences, with a decrease in some areas and an increase in others. Industries such as travel and tourism have been hit hard. At the other situation, consumer packaged products and medical equipment and supplies are seeing major increase in demand. That puts a high-pressure role to increase production on manufacturers. Manufacturers of these products are now having to run 24/7 with maximum capacity in order to meet global demand. On the medical front, ventilators and personal protective equipment like face masks are considered as a critical and emergency need, and manufacturers have expanded production in order to meet the increased demand according to Kyanon (2021).

Covid-19 has also created supply chain disruption causing many problems which has created several consequences on global economy such as delivery delays and increased costs Kyanon (2021) and Roblek et al. (2022) are emphatic that with the scale of the global economic slowdown still unknown and

COVID-19 spreading still complicated, manufacturers are unsure when business would return to normal. This created some level of uncertainty within the business community.

Actions recommended to be taken

In volatile and uncertain business environments, manufacturers experience volatile situations. In such complex situations, management is faced with a multitude of decisions that are often unclear. In the Covid-19 crisis, enterprises learned the importance of adopting more agile and flexible business models (e.g., nible organisation model) and shifting to digital business. Others also include strategic planning, technological advancement, and training as expressed by Addo (2017)

According to Liedholm, MacPherson and Chuta (1994), Strategic planning and implementation is often needed in modern day business environment to thrive. Business management now has become dynamic and complex as consumers are now sophisticated and more informed than ever. Local companies often do not carry out proper strategic planning in their operations (Osamwonyi, & Tafamel, 2010). International Trade Corporation (2014) has observed that in developing countries, simple information and communications technology (ICT) solutions, such as access to the internet or the creation of a business website, often represent a significant challenge for the sector (McCormick & Maalu, 2011; Chatterjee, Grewal, & Sambamurthy, 2002) and therefore if implemented, could bring improvement on production floors.

Apart from the above recommendation, Yiga (2020) also added that organisations should know their risks, map up the entire supply chain of the organization, build a diverse of supply chain networks, follow due process of procurement, and plan for business continuity.

In addition, Globalspec (2022) is of the view that manufacturing facilities are attempting to re-commence work with a focus on keeping employees safe via social distancing tools and robots. Some are even pivoting their production lines to manufacture in-demand products it did not during pre-pandemic area.

Two years down the line, it is paramount that research is conducted to assess how plants and for that matter production floors have implemented to keep the production running in Ghana in the mist of all the challenges that come along with the effect of Covid-19.

II. MATERIAL AND METHODS

Respondents were simple randomly selected and a mixture of both open ended and closed ended questionnaires were administered. Data collected was then analysed using Statistical Package for Social Sciences (SPSS) programme.

III. RESULTS AND DISCUSSION

Nine respondents responded to the questionnaires administered which eight of them are located in Accra, the capital city and one from Kumasi. Six (6) of the respondents



are into printing/packaging industry, and three (3) are into food/beverage processing industry with years of establishment covering between 1974 to 2020 with as small as 15 staff to as many as 160 staff covering the nine companies. one company having all male staff whiles another company having more females than males. Four (4) of the companies have number of staff ranging from 130 to 160 staff before and after Covid-19 struck whiles the rest of the 5 respondents have staff ranging from 10 to 55.

This is an indication that it is a mixture of small and medium size organisations for both manufacturing sectors and therefore gives a better opportunity to make concrete conclusions after comparing what happened on the production floor before Covid-19 happened and after then.

Gender parity

The table 1 below indicates from the nine companies sampled, there were 393 males and 299 females were on the production floor before Covid-19 struck, then after 386 males and 295 females were engaged. This meant that there is currently 1.78% and 1.34% deduction in male and female engagement respectively on the production floors.

Table 1

	Male	Female
Before	393	299
After	386	295
DIFFERENCE	-7	-4
Percentage deduction	1.78117	1.337793

Human resource management

44% of the respondents rarely conduct training for production staff pre-Covid 19. At Covid-19 struck, it dropped to 33.3%

Quality management system and its implementation

All respondents as shown in table 2, confirmed that they had quality management system in place before Covid-19 struck but only 6 out of the 9 respondents fully implemented it. When Covid-19 struck, respondents confirmed that they still had quality management system in place and they all agreed that the quality management system is currently fully in use.

Table 2

	QMS available	QMS fully implemented	%
Before	9	6	66.66667
After	9	9	100

Again, when the data was analyzed sector by sector, two from the printing/packaging sector and one from the food and beverage sector recording 33.3% did not fully implemented quality management system before Covid 19 struck.

Also, only three out of the nine respondents representing 33.3% had the quality management system certified by external bodies before Covid-19 struck but when after covid 19 struck, it increased to four respondents who had their quality management system externally certified.

Supplies

Sourcing of supplies hasn't changed before and after Covid-19 struck. Before Covid-19 struck, only one respondent source locally only. another one source from the foreign market whiles seven of them source from both local and foreign market and it didn't change after Covid-19 struck. Again, seven of the respondents' source from different markets or countries whiles two of the respondents depend on only one market or country before Covid-19 struck. However, after Covid-19 struck, all respondents started sourcing from different markets or countries. Eight out of the nine respondents selected their suppliers based on quality same as before Covid-19 struck, six out of nine selected based on availability same as before Covid-19 struck. however, before Covid-19 struck, six of the respondents also selected based on price, it dropped to five out of the nine after Covid-19 struck. Again, eight of the respondents used the just in time model to manage their inventory system before Covid-19 struck with only one respondent using a mixture of just in case and just in time models. However, when after Covid-19 struck three of the respondents started implementing just in case system. When companies realized that Covid-19 caused disruption in the supply chain, thereby making it difficult for companies to get their suppliers on time, they began increasing inventory so that in case there was shortage, they could depend on that.

Operations

The production system deployed by the companies sampled used either automated or semi-automated operations. Before Covid-19 struck, six of the respondents representing 66.67% were semi -automated whiles 33.33 were automated. Same percentage representing automated and semi-automated operation after Covid-19 struck. It is an indication nothing much has change in that regard.

The production schedules used on the sampled companies showed that the run one to three shifts per day. All respondents except one maintained the shift systems used before and after Covid-19 struck. Only one company changed from two shifts per day pre-covid-19 to one shift per day post Covid-19.

Two of the respondents decreased their number of teams from three and four teams before Covid-19 to two teams each after Covid-19 struck. The rest of the respondents maintained the same number of teams used before and after Covid-19 struck however they maintained the same number of working hours per day.



Maintenance

Five of the respondents representing 55.5% have their own inhouse engineering team undertaking maintenance works on machinery used in production before Covid-19 struck and it didn't change after Covid-19 struck. Four other respondents representing 44.4% used both external and inhouse engineers before covid 19 struck, however, it dropped to three respondents using both external and inhouse engineers and one using only external engineers after Covid-19 struck.

Again, with regards to what type of maintenance style used, three of the respondents used corrective maintenance, four of the respondents use preventive maintenance whiles two respondents used a combination of preventive, corrective and predictive maintenance. However, post- Covid-19 indicates that six respondents use preventive maintenance whiles uses a combination of preventive, corrective, and predictive maintenance. This indicates that machines are robust post Covid-19 as compared to pre Covid-19.

In addition, all respondents confirmed that they have maintenance schedule pre-Covid-19 and post Covid-19. However, four of the respondents say this maintenance schedule is used partly before and after Covid-19 struck.

Health and safety

Eight of the respondents had health and safety policy in place before Covid-19 struck as compared to all respondents having the policy in place after Covid-19 struck. Seven of the respondents went through medical checkup before been employed during pre-covid era but increased to eight respondents post Covid-19

62.5% of the respondents undertook a yearly mandatory medical checkup pre-Covid -19 and same after Covid-19 struck. 12.5% of the respondents undertook a quarterly mandatory medical checkup whiles 37.5% of the respondents did not undertake any mandatory medical checkup, same after Covid-19 struck.

100% of the respondents confirm that production staff are provided with personal protective equipment pre and post covid-19. 11.1% disagree that staff are not educated sufficiently on the value of health and safety on the production floor.

IV. CONCLUSION

Research confirmed Yiga (2020) advice on the view that organisations should know their risks, map up the entire supply chain of the organization, build a diverse of supply chain networks, follow due process of procurement, and plan for business continuity. Organisations sampled have expanded their supply chain networks either locally or internationally to avoid supply disruptions on the production floor.

Production schedules were changed largely to reduce congesting on the production floor. Health and safety is taken seriously currently then before even though more is still needed to be done in that regard.

Also, currently, there has been consistent desire to improve the quality of products by implementing quality management system as compared to when pre-covid-19 era. Also, training of production staff has improved after Covid-19 struck.

In addition, quick response to machine breakdown is paramount in post Covid-19 era so that products can be manufactured on time therefore it isn't surprising that most of the companies keep inhouse engineers and all respondents had maintenance schedule in the post-Covid-19 era.

In the area of health and safety, there has also been some improvement since Covid-19 struck. Any outbreak of any disease on the production floor will have a devastating effect on the performance of plants. Therefore, it is important that health and safety is taken cared off on the production floor.

In conclusion, there has been some marginal changes in sub section categorized in assessing strategies implemented on production floors after Covid-19 struck. This confirms the ascension that changes were made on production floors when Covid-19 struck to improve productivity and cost reduction.

List of abbreviation

Not applicable

V. REFERENCE

- [1]. Addo, "The impact of manufacturing industries on Ghana economy", International journal of research studies in management, 2017.
- [2]. Balchin, N., Coughlin, P., Papadavid, P., te Velde, D.W. and Vrolijk, K., "Economic transformation and job creation in Mozambique". Synthesis Paper, London, ODI, SET Programme, 2017.
- [3]. Chatterjee, D., Grewal, R., & Sambamurthy, V., "Shaping up for e-commerce: institutional enablers of the organizational assimilation of web technologies", MIS quarterly, 26(2), 65-89, 2002.
- [4]. Free, C. and Hecimovic A., "Global supply chains after COVID-19: The end of the road for neoliberal globalisation?" Accounting, Auditing & Accountability Journal, 34: 58–84. 10.1108/AAAJ-06-2020-4634 [CrossRef] [Google Scholar], 2021.
- [5]. Ghana Statistical Services, "Rebased quarterly gross domestic product 2013Q1-2021Q3" 2021. <https://statsghana.gov.gh/gssmain/fileUpload/National%20Accounts/Rebased%20GDP%20quarterly%20bulletin%20december%202021%20edition%2022%2012%2021%20web.pdf>
- [6]. Globalspec, "How manufacturers are adapting to COVID-19", 2022 <https://insights.global-kyanon.com/2021/05/10/how-has-covid-19-changed-the-manufacturing-industry/>
- [7]. Gkeredakis, M., Lifshitz-Assaf, H., & Barrett, M., "Crisis as opportunity, disruption and exposure: exploring emergent responses to crisis through digital technology", 2021. Information and Organization, 31



- (1. <https://doi.org/10.1016/j.infoandorg.2021.100344>)
<https://doi.org/10.1016/j.infoandorg.2021.100344>
[spe](https://doi.org/10.1016/j.infoandorg.2021.100344)
[c.com/article/14743/how-manufacturers-are-](https://doi.org/10.1016/j.infoandorg.2021.100344)
[adapting-to-covid-19](https://doi.org/10.1016/j.infoandorg.2021.100344)
- [8]. Liedholm, C., McPherson, M. A., & Chuta, F., “Small Enterprise Employment Growth in Rural Africa”, *American Journal of Agricultural Economics*, 76, 1177-1182, 1994. <https://doi.org/10.2307/1243413>
- [9]. McCormick, D., & Maalu, J., “Innovation hubs and small and medium enterprises. Africa Setting the Policy Agenda”, 2011.
- [10]. McMillan, M., Page, J., Booth, D. and te Velde, D.W., “Supporting economic transformation: An approach paper”, London: Overseas Development Institute, 2017.
- [11]. Osamwonyi I.O, Tafame A.E, “Options for sustaining small and medium size enterprises in Nigeria: Empahsis on Edo State”, *Afr. Res. Rev.* 4(3b), 2010.
- [12]. Raza, “Manufacturing Operations Management Post COVID-19- What’s Next?”, 2020 <https://throughput.world/blog/manufacturing-operations-post-covid-19/>
- [13]. Roblek, V., Meško, M., Pušavec, F., & Likar, B., “The role and meaning of the digital transformation as a disruptive innovation on small and medium manufacturing enterprises”, *Frontiers in Psychology*, 12, 2129, 2021.
- [14]. Willem te Velde, “Manufacturing in Africa; factors for success”, DFID, 2018.
- [15]. Woods and Kromer, “Managing the challenges of the post COVID workplace”, 2020. <https://www.cms-lawnow.com/ealerts/2020/10/managing-the-challenges-of-the-post-covid-workplace>
- [16]. Yiga, “Covid-19: why south African manufacturers should reconsider their supply chain”, 2020. <https://www.sage.com/en-za/blog/covid-19-why-south-african-manufacturers-should-reconsider-their-supply-chain/>

IJEAST

INTERNATIONAL JOURNAL
OF ENGINEERING APPLIED SCIENCE
AND TECHNOLOGY

ABOUT IJEAST

International Journal of Engineering Applied Science and Technology (IJEAST) is a peer-reviewed, open access journal that publishes high-quality research papers in the field of Engineering, Applied Science and Technology.

IJEAST aims to provide a platform for researchers, academicians, and professionals to share their innovative ideas, research findings, and practical experiences with the global scientific community.

FOCUS AREAS

- Engineering
- Applied Science
- Technology
- Innovation & Development
- Interdisciplinary Studies



PEER REVIEWED

All submissions are rigorously peer reviewed to ensure quality.



OPEN ACCESS

Free and unrestricted access to research for all.



GLOBAL REACH

Connecting researchers and professionals worldwide.



TIMELY PUBLICATION

We ensure a swift and efficient publication process.



For more information, visit our website

www.ijeast.com



INTERNATIONAL JOURNAL

OF ENGINEERING APPLIED SCIENCE
AND TECHNOLOGY

✉ editor@ijeast.com

🌐 www.ijeast.com

📍 India



2455-2143