IMPACT OF WORKING FROM HOME ON PRODUCTIVITY & PERFORMANCE, EVIDENCE FROM NORTH AMERICAN LOGISTICS INDUSTRY DURING COVID-19 PANDEMIC

Fatih YEGUL[1], Atif ACIKGOZ[2], Zaur KAZIMOV[3]
[1]*School of Business, Conestoga College, Kitchener, ON, Canada*
[2]*John Molson School of Business, Concordia University, Montreal, QC, Canada*
[3]*Traffix Inc., Milton, ON, Canada*
fyegul@conestogac.on.ca
atif.acikgoz@concordia.ca
zkazimov@traffix.com

Abstract: *This paper analyzes the impact of shifting all employees from office-based working to working from home (WFH) on productivity and performance. Before the COVID-19 Pandemic, there were no instances of companies moving all of their employees to WFH indefinitely. This is one of the first case studies analyzing this new phenomenon supported by hard criteria for productivity and performance measures. We define productivity as the quantity and performance as the quality of the output. We collected our data from a North American 3rd Party Logistics company and employed a multimethod approach to examine the effects of this organizational change forced by the COVID-19 Pandemic. We gathered data from the employees through video interviews and online surveys. We compiled the performance metrics from the corporate database and received commentary from top management. We also used national statistics databases to delineate the specific market conditions. Figures indicate evident improvements in revenues, profits, and labor productivity after the shift to WFH. We also examined other potential moderating factors, such as changes in market conditions, improvements in business processes, and/or management approaches, to distinguish the effect of remote working. Overall results show that when accompanied by solid leadership strategies and proper communications, and with investment in IT technologies, working from home improves productivity with little or no effect on performance. Our findings offer valuable insights for managers who need to make strategic decisions about WFH arrangements for their companies, especially brokerage-type businesses, more specifically those in the logistics industry. The study is based on data from a case study involving one company, preventing the authors from generalizing their findings.*

Keywords: Telework; Productivity; Performance; Logistics; COVID-19

JEL Classification: *D24; O33; M12; M21; M54*

1.Introduction

Although many companies already had the technological infrastructure to make remote work at least as efficient as working at the office, no company had ever dared to close their physical locations and ask all their employees to work from

home. This was until World Health Organization declared COVID-19 a pandemic (WHO, 2020). Consequently, companies that were deemed non-essential businesses were forced to seal their office doors indefinitely due to lockdown regulations, although employees continued working from their homes.

Before the Covid-19 Pandemic ('the Pandemic' hereafter), working from home (WFH) was commonly used to describe an arrangement where certain employees spent a portion of their employment hours working remotely (e.g., from home) with the support of advanced communication technologies. In such arrangements, a central office location is always available both to WFH and non-WFH workers. Although pre-pandemic studies overwhelmingly link WFH to positive organizational outcomes (e.g., productivity, performance, absenteeism, job satisfaction, work-life balance, and cost savings) (Hackney *et al.*, 2020), the corporate uptake has been very low. Organizations have been reluctant to increase their WFH intensity as they must have assumed that its challenges (e.g., the need for moving away from direct supervision to management by objectives, legal uncertainties, reduced sharing of implicit knowledge, need for new infrastructure, data security concerns) (Boell *et al.*, 2013) would outweigh its potential benefits. In this regard, for example, Mahler (2012) noted that despite all its advantages, making WFH widespread might bring about organizational complexities, including possible disaffection between teleworkers and non-teleworkers. Therefore, organizations acted cautiously about remote working by limiting the WFH practices to certain employees with regulated frequency (e.g, Turetken *et al.*, 2011, Virick *et al.*, 2010).

The Pandemic has been a game-changer in that sense. Many organizations had to ask as many employees as possible to work from home indefinitely. In the U.S. rate of those who perform most or all of their work from home, at one point, rose to 71% (Parker *et al.*, 2020). This shift posed new challenges for the organizations. Before the Pandemic, except for some pilot projects to understand its implications (e.g., Bloom *et al.*, 2015), it was not common to have a sizeable workforce segment to work away from the office continuously. Therefore, there have been limited studies, if any, analyzing the impacts of such new work arrangements, where all employees work from home indefinitely without any central work location, on a company's performance.

Based on a case study, we examined the effects of switching from a traditional office-based work setting to a full-WFH[1] environment on performance metrics. In this regard, we compared a company's pre- and post-performance metrics. With only a few exceptions, both pre-Pandemic and Pandemic-time WFH studies use self-reported data to measure a company's performance metrics (Hackney *et al.*, 2020). Instead, we used hard criteria, namely data from the corporate ERP database.

In contrast with pre-Pandemic findings, early studies during the Pandemic indicate mixed results in terms of performance metrics. Percentage of research that demonstrates improvement in performance metrics has fallen from 79% to 23% (Hackney *et al.*, 2020). We see this as an indicator that the pre-Pandemic era conventional WFH practices and implications differ vastly from full-WFH settings. Consequently, their outcomes need to be explored with respect to defined contexts rather than being generalized. The current research analyzes the outcomes of full-

[1] *Full-WFH: all employees working remotely indefinitely without any central working location.*

WFH settings using a case study, which can offer fresh perspectives for brokerage-type of businesses, such as 3rd and 4th Party Logistics (3PL) companies.

2.Impact of WFH on Organizational Outcomes

Telecommuting has been the subject of a vast body of research since the concept was first coined in the 1970s (Nilles, 1975). Scholars used several different terms to identify the practice of employees working away from a central working location, including telework (Bailey and Kurland, 2002), home-based work (Tietze and Nadin, 2011), remote work (Yang *et al.*, 2021), anywhere working (Blount, 2015), or flexible work arrangements (Atiku *et al.*, 2020).

The most commonly used metrics in pre-Pandemic WFH studies to measure organizational outcomes are productivity and performance. Pandemic time WFH studies, on the other hand, mainly ignored the performance numbers and measured productivity (Hackney *et al.*, 2020). We use the same metrics in the study, and we define productivity as the quantity, and the performance as the quality of the output (Turetken *et al.*, 2011). We also analyze the change in company profits as another objective measure of overall organizational output, which, to the best of our knowledge, distinguishes our study from all other research in the field.

Several studies that report on organization output use surveys to collect data from employees that work in diverse industries and rely on self-reported/perceived productivity and/or performance data. For example, Turetken *et al.* (2011) suggested a positive relationship between WFH success (productivity and performance) and rich communication and employee work experience. Similarly, Torten et al. (2016) showed a positive relationship between years of WFH experience and productivity, which does not apply to performance. Lippe and Lippényi (2020) reported that although employees who work from home performed better, they negatively affected their co-workers' performance, who never worked from home. Kazekami (2020) determined that WFH increased productivity as long as companies could strike the right balance between office hours and WFH hours. Davidescu et al. (2020) found that WFH improved productivity and recommended a hybrid model mixing office working and WFH practices.

There are industry-specific studies that have reported productivity and performance gains with WFH; e.g., Tustin (2014) in higher education/academia, Vega *et al.* (2014) and Tietze and Nadin (2011) in the public sector, and Delanoeije and Verbruggen (2020) in construction.

A small number of studies use hard criteria to measure the productivity of workers. Analyzing the data from an experiment in a large travel agency in China, where some workers switched to full-WFH mode for nine months, Bloom *et al.* (2015) detected a 13% increase in performance. Dutcher (2012) concluded that WFH practices might increase productivity for creative tasks while negatively affecting the same for dull tasks.

The Pandemic era research primarily focuses on the changes in perceived productivity rather than performance. Analyzing the output of the software developers, Ralph et al. (2020) found that WFH had a diminishing effect on their productivity and well-being. Atiku et al. (2020) reported improved productivity based on data from employees working in diverse sectors in several African

countries. Chapman et al. (2020) concluded that medical researchers were able to complete more tasks while working from home during the Pandemic. In a mixed-sector study, Toscano and Zappalà (2020) found evidence that productivity deteriorated due to social isolation caused by WFH during the Pandemic. Bucurean (2020) surveyed mixed-sector employees, in which only 43% reported improved productivity, while 57% said the opposite. Based on a survey of public sector workers, Drumea (2020) reported deteriorated productivity. Beno and Hvorecky (2021) determined that productivity fell among the service workers of a sports and leisure company in Austria. Naor et al. (2021) collected organization-level data from diverse sectors in Israel, where three of the six companies stated improved productivity. Farooq and Sultana (2021) found a negative relationship between WFH and productivity among hospitality, banking, and information technology employees during the Pandemic in India.

The conflicting results regarding productivity during the Pandemic can indicate that the full-WFH settings must be analyzed contextually, such as business sector or type of work performed. Pandemic-era studies inevitably report relatively premature results as they collected their data when companies experienced only a few months of full-WFH practice without much planning. Therefore, more research is needed to analyze longer-term effects. We should also note that switching to a full-WFH setting is a new phenomenon for organizations, which differs vastly from the research on WFH settings conducted before the Pandemic. This paper is the first study in the literature to analyze the effects of switching to full-WFH on productivity and performance using hard criteria with a multimethod approach spread over a year.

3.Methodology

Traffix Inc. (Traffix hereafter) is a light-assets-based 3rd party logistics company headquartered in Milton, Ontario, Canada serving customers throughout North America with branches in Canada, U.S., and Mexico. Traffix's primary source of revenue is overwhelmingly brokerage services that match shippers with carriers.

When the Pandemic hit, to ensure its employees' safety and comply with government regulations, Traffix suspended office-based work and switched to WFH. Traffix already had the necessary IT infrastructure before the Pandemic and has allowed some employees to work from home occasionally to accommodate specific personal or business needs. Thus, the transition to WFH was a relatively smooth operation from a technological standpoint.

To capture the effects of the new work setting more reliably, we employed a case-based multimethod approach.

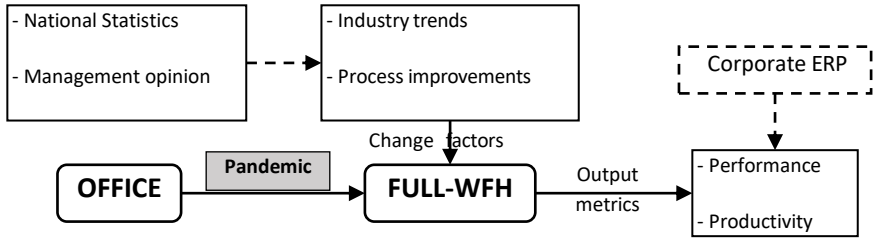

Figure **1** displays the research analysis framework.

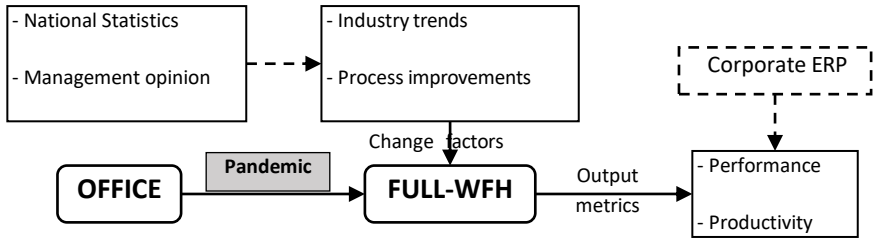

Figure 1: Research Analysis Framework

We gathered the case data using the following four primary tools:
(1) Three months after the Pandemic, during July and August 2020, we conducted video interviews with 12 employees selected based on their level of seniority in the company. **(2)** After about one year from the start of the Pandemic, employees filled out online surveys (using Qualtrics®) on how they perceived the implications of full-WFH compared to working at the office. **(3)** Traffix provided us with hard data on several KPIs (key performance indicators) extracted from their corporate ERP database measured monthly from January 2018 to March 2021, which we used to analyze the changes in labor productivity and performance and the company's bottom line. **(4)** Once we completed our initial data analysis gathered from the aforementioned sources, we received written commentary from Traffix top management regarding how they interpreted our findings.

4.Results: Productivity and Performance

As a light-assets 3PL, Traffix makes the bulk of its revenues from the brokerage services between the shippers and the carriers. Traffix employs three main types of staff, which constitute more than 75% of the whole workforce. [1] Customer Sales Staff (CS): finds the loads to be shipped, [2] Carrier Sales Staff (RS): finds the carriers to transport the loads, and [3] Service Representatives (SR): assists CS and RS in fulfilling clerical tasks. CS and RS are compensated with a fixed salary plus commissions based on the profits from each load shipped as a result of their work. SRs, on the other hand, are compensated with a fixed salary. Thus, the operations of Traffix are driven by CS and RS supported by SRs. We define the total number of CS and RS as the total number of Operations Staff (OPS = CS + RS).
Traffix provided us with data from Jan 2018 to March 2021. For confidentiality reasons, Traffix did not reveal the actual revenue and profit figures. Therefore, we measured the revenue growth using the number of loads fulfilled each month (*L*). And for profit, we use a monthly index calculated through the rate of change in profits (over nominal $ value). The profit index is a measure based on the price and the cost difference, so it does not incorporate the overhead costs.

$$P_{i+1} = P_i \times PC_{i+1}$$

Where:
$\boldsymbol{P_i}$**:** Profit index for month *i*, $\boldsymbol{PC_{i+1}}$**:** rate of change in profits from month *i* to month *i+1* (provided by Traffix), and $\boldsymbol{P_{Jan18}} = 100$ (Profit index for January 2018)

Profit Margin for a load measures the difference between the price charged to the customer (shipper) and the price paid to the carrier. Monthly profit margin (*PM*) is the average of profit margins from all loads fulfilled during any given month.

$$PM_i = \frac{\sum_{n=1}^{N_i} P_{in}}{N_i} \quad (2) \qquad P_{in} = \frac{(PS_{in} - PP_{in})}{PS_{in}} \quad (3)$$

Where:
$\boldsymbol{PM_i}$**:** Profit margin for month *i*, $\boldsymbol{P_{in}}$**:** Profit margin for load *n* in month *i*, $\boldsymbol{PS_{in}}$**:** Sales price (charged to the shipper) for load *n* in month *i*, $\boldsymbol{PP_{in}}$**:** Purchasing price (paid to the carrier) for load *n* in month *i*, $\boldsymbol{N_i}$**:** Total number of loads fulfilled in month *i*.

Although researchers may compute productivity and performance figures differently from case to case, the definitions embrace common characteristics, such that productivity being about the quantity of the output and performance being about the quality of the output (Tangen, 2005). Accordingly, we take *PM* as a metric to analyze the company performance, namely the quality of the output, whereas we use *ML* to measure productivity, namely the quantity of the output. To examine the effects of WFH more precisely, we also computed the overall labor productivity in terms of loads fulfilled and profit index.

$$LPL_i = \frac{L_i}{OPS_i} \quad (4) \qquad LPP_i = \frac{P_i}{OPS_i} \quad (5)$$

Where:
$\boldsymbol{LPL_i}$**:** Labor productivity based on the number of loads fulfilled in month *i*, $\boldsymbol{LPP_i}$**:** Labor productivity based on the profit index in month *i*, $\boldsymbol{OPS_i}$: Total number of operations staff in month *i*.

Traffix displayed a high growth trend since it moved to full-WFH (**Figure 2**). It has already been steadily increasing its revenues before the Pandemic, although its profits mainly remained unchanged (**Figure 3**), as reflected by the declining profit margins (**Figure 4**).
Traffix revenues, profits, and profit margin display an upward trend from early 2018 to mid-2018. However, from mid-2018 to the start of the Pandemic, revenues continued to rise slower, and profit margin was on a downward trend, with a slight fall in the profit index. After moving to full-WFH, revenues and profits grew faster, while profit margins mainly remained steady at around 15%.
The number of operations staff has also been steadily increasing on par with the revenue growth. Between Jan 2018 and March 2021, revenue, profits and the size of the operations team almost tripled. Labor productivity can be measured in terms of profit per operations staff or loads per operations staff, both of which indicate a sharply increasing trajectory (Figure 5). The reason 'profits-per-OPS' increased faster than the 'loads-per-OPS', although PM remained around the same, is the considerable hikes in market prices for truck-based freight (verified by Traffix sales data).
Labor productivity peaked in August 2018 and showed a steady downward trend before shifting its direction upwards again at precisely around the start of the Pandemic. Labor productivity caught up with its peak levels one year after switching to full-WFH. In August 2018, Traffix had 105 operations staff. As the staff numbers gradually grew to the level of 180s just before the Pandemic, labor

productivity hit its lowest point. Traffix was employing 216 operations staff in March 2021, when it hit back to its highest labor productivity levels.
As a non-operations metric, we checked Accounts Receivable (AR) overdue ratio that assesses finance department employees' performance. It represents the ratio of outstanding receivables from customers. Lowering the AR overdue ratio improves the cash flow of the company. ERP data shows a trajectory of the metric, which follows a marginally downward trend between Jan 2018 and the start of the Pandemic. After that, we observe a noticeable decrease (81% to 65%). Traffix officials stated that they put some concerted effort into targeting overdue payments since the beginning of the Pandemic, which yielded results even when all staff worked from home.

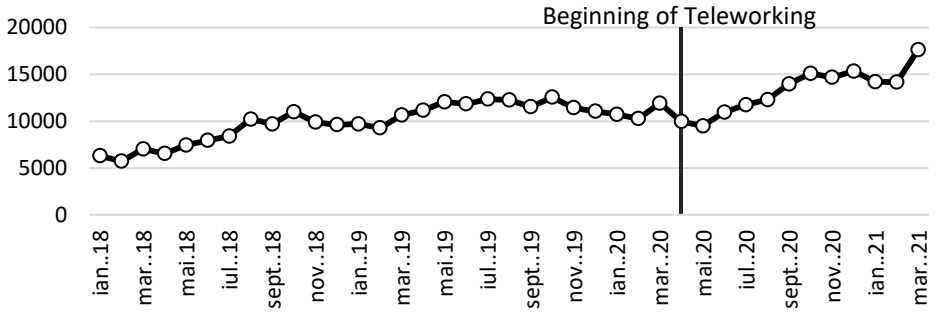

Figure 2: Monthly total number of loads (L) fulfilled by Traffix.

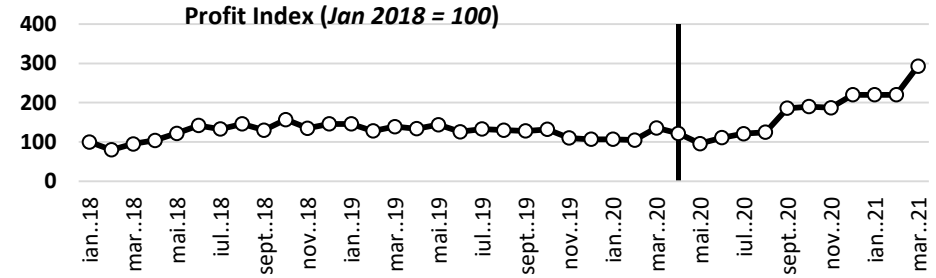

Figure 3: Monthly profit index.

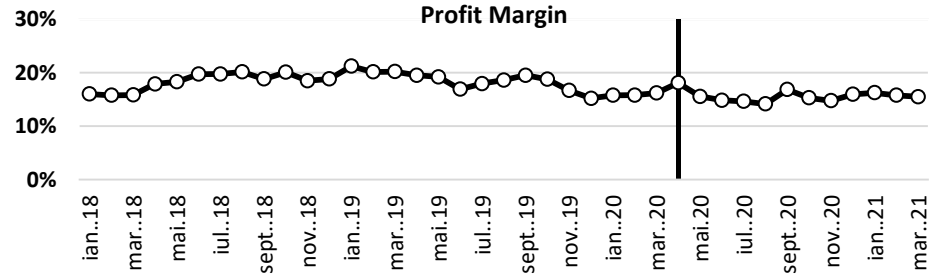

Figure 4: Monthly profit margin

Labor productivity peaked in August 2018 and showed a steady downward trend before shifting its direction upwards again at precisely around the start of the Pandemic. Labor productivity caught up with its peak levels one year after switching to full-WFH. In August 2018, Traffix had 105 operations staff. As the staff numbers gradually grew to the level of 180s just before the Pandemic, labor productivity hit its lowest point. Traffix was employing 216 operations staff in March 2021, when it hit back to its highest labor productivity levels.

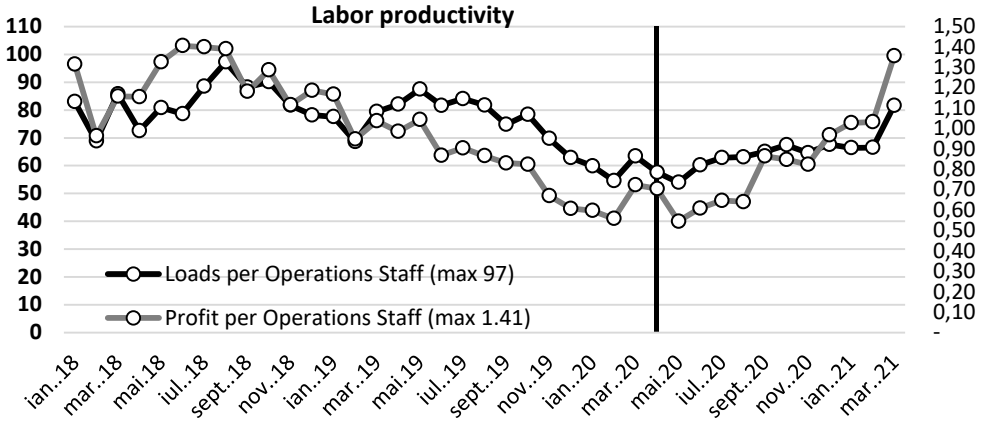

Figure 5: Labor productivity measured by profit index and the total number of loads

As a non-operations metric, we checked Accounts Receivable (AR) overdue ratio that assesses finance department employees' performance. It represents the ratio of outstanding receivables from customers. Lowering the AR overdue ratio improves the cash flow of the company. ERP data shows a trajectory of the metric, which follows a marginally downward trend between Jan 2018 and the start of the Pandemic. After that, we observe a noticeable decrease (81% to 65%). Traffix officials stated that they put some concerted effort into targeting overdue payments since the beginning of the Pandemic, which yielded results even when all staff worked from home.

5.Results: Employee Perceptions

We invited a total of 351 employees to fill out an extensive survey in five parts over three months. Column titled "n" in Table 1 shows the number of respondents in each survey. Around 62% of the respondents are male, 55% are from Canada, 42% are from the U.S., and 3% are from Mexico. About half of the respondents are operations staff (29% CS, 24% SR, 23% RS, 15% management, and 9% finance department staff). Employees from 10 branches out of 13 completed the survey. Although the sample represents a veteran group with an average work experience of 16.3 years and an average industry experience of 9.7 years, former involvement in some form of WFH is significantly low, with an average of 1.4 years. Table 1 summarizes the survey results measuring employee perceptions before and after moving to full-WFH for several attributes. Each attribute is assessed based on scales that have been shown to be reliable in related literature. Respondents answered multiple questions for all attributes using a Likert scale from 1 to 5.

Employees responded to each question twice, reflecting first on their perceptions when work was at the office and then when working remotely. All response sets were analyzed statistically using T-test (paired two samples for means) to understand whether the difference between sample means from office work and full-WFH was statistically significant. Employee perceptions during full-WFH were improved for most attributes.

Table 1: Summary of employee survey results*

	Means		Difference			
Attributes	**Office**	**WFH**	**Deviation**	**Stat. Sig?**	**n**	**Nature of Deviation**
[1] Employee Burnout	2.81	2.72	-0.09	YES	103	Favorable
Emotional Exhaustion	2.69	2.37	-0.33	YES	103	Favorable
Personal Accomplishment	3.72	3.80	0.09	YES	103	Favorable
Depersonalization	2.03	1.99	-0.04	YES	103	Favorable
[2] Job Stress	3.52	3.36	-0.16	YES	103	Favorable
[3] Work Engagement	3.69	3.85	0.16	YES	103	Favorable
[4] Improvisation	3.368	3.369	0.001	**No**	103	N/A
[5] Psychological Safety	3.53	3.61	0.08	YES	84	Favorable
[6] Human-Computer Trust	3.45	3.62	0.17	YES	70	Favorable
[7] Workplace Gossip	2.78	2.75	-0.03	YES	70	Favorable
Job-related	2.99	3.02	0.02	YES	70	Unfavorable
Non-job-related	2.57	2.48	-0.08	YES	70	Favorable
[8] Workplace Trust	3.80	3.91	0.12	YES	76	Favorable
Trust in System	3.72	3.85	0.13	YES	76	Favorable
Interpersonal	3.87	3.97	0.11	YES	76	Favorable
[9] Leadership	3.67	3.92	0.25	YES	76	Favorable
Task-oriented	3.71	3.88	0.17	YES	76	Favorable
Leadership-oriented	3.62	3.95	0.33	YES	76	Favorable
[10] Work-Life Balance	3.31	3.41	0.10	**No**	72	N/A
[11] Time Scarcity	2.50	2.33	-0.17	YES	72	Favorable
[12] Monitoring	2.51	2.40	-0.11	YES	72	Favorable

Stat. Sig?: Statistically Significant?, **n:** Sample size; the number of respondents.

Attribute scales are adapted from: [1] (Maslach and Jackson, 1981), [2] (Keller, 1984), [3] (Schaufeli *et al.*, 2006), [4] (Moorman & Miner, 1998), [5] (Edmondson, 1999), [6] (Gulati *et al*., 2019), [7] (Kuo *et al.*, 2015), [8] (Gould-Williams, 2003), [9] (Liao, 2017), [10] (Brough *et al.*, 2014), [11] (Bond and Feather, 1988), [12] (Stanton and Weiss, 2000).

6.Discussion and Conclusions

Before the Pandemic, despite its many advantages, WFH practices had never become the norm, although some companies allowed certain employees to work remotely at specified times. In such arrangements, though, there is always a common office location where staff members work together when they are not working remotely. Due to the Pandemic and the lockdown regulations enforced by governments worldwide, many organizations had an opportunity to experiment with the full-WFH environment for the first time. Previously, a few experimental pilot

projects have compared the productivity of those working at the office and those working remotely. Nevertheless, we had never had cases before the Pandemic, where we could compare the productivity of a group of employees working at the office and the productivity of the same group when they were all working from home with no common office location for an indefinite time.

In this study, we analyzed the case of Traffix, a North American logistics company, from that perspective. We argue that the effects of significant organizational changes, such as the shift to full-WFH, should be examined contextually. This study offers important insights as companies begin to make long-term strategic decisions about their working environments after the Pandemic.

Although Traffix already had the necessary infrastructure to switch to full-WFH before the Pandemic, the management has not considered the option. Traffix had not previously offered regular WFH accommodations to most staff members. Companies usually have been hesitant and skeptical about WFH, and have only adopted it partially for specific roles as they thought it would pose several managerial challenges. Answering a question during the interviews about how their approach regarding WFH changed with the experiment, one top Traffix official commented:

> *"Day and night… We had a fear of it. We experienced failure with some individuals who worked from home. We didn't have branches close to them, so they had to work from home when we hired them, which was unsuccessful. We actually didn't believe in it, and then we were forced in March to re-evaluate, and we are significantly more supportive now."*

We observed significant increases in critical organizational outcomes, including revenue, profit, and labor productivity, although performance (measured by average PM) has remained primarily unchanged. We can argue that as business volume and labor productivity continued to increase, management and the employees had to spend more time handling the demand with less or no time to focus on improving the PM. Another possibility is that a lower PM is the basis of the cost-oriented competitive factor for Traffix, which plays a role in bringing in more business to the company.

Although we see evident improvements in revenues, profits, and labor productivity after the shift to full-WFH, further analysis is necessary to show the causality, even though enhanced employee experience is a supporting factor. There might be other moderating factors, such as changes in market conditions and improvements in business processes and/or management approaches.

With the Pandemic, economies worldwide suffered dramatically, while some specific sectors thrived thanks to the opportunities created by the new way of life during the lockdowns (Sharma, 2020). GDP in the truck transportation industry has declined after the pandemic[2]. Despite some positive adjustments, it never returned to its pre-pandemic levels when this paper was written in Canada or the United States, two major markets for Traffix. So, we can suggest that the post-pandemic sales growth of Traffix does not correlate with the growth trend in the relevant industry.

[2] *Taken from Statistics Canada and United States Bureau of Economic Analysis*

Traffix officials have confirmed that there have been no significant changes in their business processes since they moved to full-WFH. We asked a top management team member how they interpreted these positive results and whether they saw a correlation between them and the success of full-WFH. Traffix management agrees that part of this success is related to increased labor productivity thanks to full-WFH:

"(…) - tens of thousands of hours have been given back to employees that were previously spent commuting, and we hope the reallocation of that time to more enjoyable activities in their personal lives has precipitated in greater overall career satisfaction. (…), our general feeling is that WFH has improved productivity in the range of 10%."

The management attributed their achievements during the Pandemic also to three other factors; (1) continued sophistication of their technology, (2) maturation of their business model in some of their newest branches, and (3) some specific favorable market conditions.

Employee experience survey results suggest that during the full-WFH, employees' work experience has improved on several dimensions. Traffix employees reported less burnout and stress levels with increased work engagement and an improved sense of psychological safety. In addition, they became more confident in the system with more trust in the management, their co-workers, and the IT systems. As a result, they could use their time more efficiently while enjoying more care from the leadership for their well-being. Especially, positive perceptions towards relationship-oriented leadership have increased significantly, which is an indication that management put extra emphasis on following up on the well-being of their employees as mentioned by a top-level manager.

There are apparent benefits of full-WFH, such as decreased real-estate and utility costs, the ability to hire talent from any geographical location (Traffix has already started listing 'fully remote work' among the incentives in its vacancy ads to attract best talents), and the elimination of daily commute for workers. Our findings suggest that if accompanied by the proper leadership strategies, and investment in communication and IT technologies, full-WFH will increase labor productivity, specifically in brokerage-type businesses, where operations staff are partly compensated based on their work output. That said, there is evidence that a hybrid approach may produce even better results. Our video interviews and other recent surveys (Decloet, 2021; Menabney Darren, 2020) indicate that most employees prefer some form of a hybrid approach. Yang et al. (2021) have shown that although most tasks can be accomplished working from home with no harm to productivity, levels of collaboration among employees may deteriorate over time, negatively affecting the innovative capacity of organizations. Parallel to this argument, Traffix management was considering a mixed setting after the Pandemic at the time when this paper was being written.

Limitations and Future Research

This study is based on a case study from a company in the logistics industry, and may not offer sufficient insights for generalization. We were able to show some causality between full-WFH and increased productivity, but it may not be possible to quantify the magnitude. So, we relied on company management's estimate. We

focused on productivity, performance and profit metrics. Future research can include other metrics such as absenteeism, turnover and cost savings. This study was funded by Conestoga College Traffix Inc.

References

1. Atiku, S.O., Jeremiah, A. and Boateng, F. (2020) "Perceptions of flexible work arrangements in selected African countries during the coronavirus pandemic", *South African Journal of Business Management*, Vol. 51 No. 1, p 10.
2. Bailey, D.E. and Kurland, N.B. (2002) "A review of telework research: findings, new directions, and lessons for the study of modern work", *Journal of Organizational Behavior*, Vol. 23 No. Special Issue, pp 383–400.
3. Beno, M. and Hvorecky, J. (2021) "Data on an Austrian Company's Productivity in the Pre-Covid-19 Era, During the Lockdown and After Its Easing: To Work Remotely or Not?", *Frontiers in Communication*, Vol. 6, p 46.
4. Bloom, N., Liang, J., Roberts, J. and Ying, Z.J. (2015) "Does Working from Home Work? Evidence from a Chinese Experiment", *The Quarterly Journal of Economics*, Vol. 130 No. 1, pp 165–218.
5. Blount, Y. (2015) "Pondering the Fault Lines of Anywhere Working (Telework, Telecommuting): A Literature Review", *Foundations and Trends in Information Systems*, Vol. 1 No. 3, pp 163–276.
6. Boell, S.K., Campbell, J., Cecez-Kecmanovic, D. and Cheng, J.E. (2013) "Advantages, Challenges and Contradictions of the Transformative Nature of Telework: A Review of the Literature", *19th Americas Conference on Information Systems.*
7. Bond, M.J. and Feather, N.T. (1988) "Some Correlates of Structure and Purpose in the Use of Time", *Journal of Personality and Social Psychology*, Vol. 55 No. 2, pp 321–329.
8. Brough, P., Timms, C., O'Driscoll, M.P., Kalliath, T., Siu, O.L., Sit, C. and Lo, D. (2014) "Work–life balance: A longitudinal evaluation of a new measure across Australia and New Zealand workers", *International Journal of Human Resource Management*, Vol. 25 No. 19, pp 2724–2744.
9. Bucurean, M. (2020) "The Impact of Working From Home on Productivity. A Study on the Pandemic Period.", *Annals of the University of Oradea, Economic Science Series*, Vol. 29 No. 2, pp 267–275.
10. Chapman, D.G. and Thamrin, C. (2020) "Scientists in pyjamas: characterising the working arrangements and productivity of Australian medical researchers during the COVID-19 pandemic", *Medical Journal of Australia*, Vol. 213 No. 11, pp 516–520.
11. Davidescu, A.A., Apostu, S.-A., Paul, A. and Casuneanu, I. (2020) "Work Flexibility, Job Satisfaction, and Job Performance among Romanian Employees—Implications for Sustainable Human Resource Management", *Sustainability*, Vol. 12 No. 15, p 6086.
12. Decloet, D. (2021) "Canadian workers are ready to come back to the office", *Financial Post*, 21 May, available: https://financialpost.com/fp-work/workers-in-canada-want-to-get-back-to-the-office-kpmg-says.

13. Delanoeije, J. and Verbruggen, M. (2020) "Between-person and within-person effects of telework: a quasi-field experiment", *European Journal of Work and Organizational Psychology*, Vol. 29 No. 6, pp 795–808.
14. Drumea, C. (2020) "Work-related Stress and Subsequent Productivity in a Teleworking Environment Induced by Pandemic-related Confinement. Evidence from the Public", *Ovidius University Annals, Economic Sciences Series*, Vol. XX No. 1, pp 337–341.
15. Dutcher, E.G. (2012) "The effects of telecommuting on productivity: An experimental examination. The role of dull and creative tasks", *Journal of Economic Behavior & Organization*, Vol. 84 No. 1, pp 355–363.
16. Edmondson, A. (1999) "Psychological safety and learning behavior in work teams", *Administrative Science Quarterly*, Vol. 44 No. 2, pp 350–383.
17. Farooq, R. and Sultana, A. (2021) "The potential impact of the COVID-19 pandemic on work from home and employee productivity", *Measuring Business Excellence*, Emerald Publishing Limited, ahead-of-print, available: https://doi.org/10.1108/MBE-12-2020-0173.
18. Gould-Williams, J. (2003) "The importance of HR practices and workplace trust in achieving superior performance: A study of public-sector organizations", *International Journal of Human Resource Management*, Vol. 14 No. 1, pp 28–54.
19. Gulati, S.N., Sousa, S.C., Lamas, D., Gulati, S. and Sousa, S. (2019) "Design, development and evaluation of a human-computer trust scale", *Behaviour & Information Technology*, Vol. 38 No. 10, pp 1004–1015.
20. Hackney, A., Yung, M., Nowrouzi-Kla, B., Oakman, J. and Yazdani, A. (2020) *Working in the Digital Economy: A Scoping Review of the Impact of Work from Home Arrangements on Personal and Organizational Performance and Productivity*, Canadian Institute of Safety, Wellness and Performance.
21. Kazekami, S. (2020) "Mechanisms to improve labor productivity by performing telework", *Telecommunications Policy*, Vol. 44 No. 2, p 101868.
22. Keller, R.T. (1984) "The Role of Performance and Absenteeism in the Prediction of Turnover", *Academy of Management Journal*, Academy of Management, Vol. 27 No. 1, pp 176–183.
23. Kuo, C.-C., Chang, K., Quinton, S., Lu, C.-Y. and Lee, I. (2015) "Gossip in the workplace and the implications for HR management: a study of gossip and its relationship to employee cynicism", *The International Journal of Human Resource Management*, Vol. 26 No. 18, pp 2288–2307.
24. Liao, C. (2017) "Leadership in virtual teams: A multilevel perspective", *Human Resource Management Review*, Vol. 27 No. 4, pp 648–659.
25. Lippe, T. van der and Lippényi, Z. (2020) "Co-workers working from home and individual and team performance", *New Technology, Work and Employment*, Ltd, Vol. 35 No. 1, pp 60–79.
26. Mahler, J. (2012) "The telework divide: Managerial and personnel challenges of telework", *Review of Public Personnel Administration*, CA, Vol. 32 No. 4, pp 407–418.
27. Maslach, C. and Jackson, S.E. (1981) "The measurement of experienced burnout", *Journal of Organizational Behavior*, Vol. 2 No. 2, pp 99–113.
28. Menabney Darren. (2020) "Slack Found Only 12% Of Workers Want To Return To The Office Full Time; This Is Good News", *Forbes*, 4 September, available:

https://www.forbes.com/sites/darrenmenabney/2020/09/04/slack-found-only-12-of-workers-want-to-return-to-the-office-full-time-this-is-good-news/?sh=14897b767246
29. Moorman, C. and Miner, A.S. (1998) "The Convergence of Planning and Execution: Improvisation in New Product Development Entrepreneurship View project", *Journal of Marketing*, Vol. 62 No. 3, pp 1-20
30. Naor, M., Pinto, G.D., Hakakian, A.I. and Jacobs, A. (2021) "The impact of COVID-19 on office space utilization and real-estate: a case study about teleworking in Israel as new normal", *Journal of Facilities Management*, ahead-of-print, available: https://doi.org/10.1108/JFM-12-2020-0096.
31. Nilles, J. (1975) "Telecommunications and organizational decentralization", *IEEE Transactions on Communications*, Vol. 23 No. 10, pp 1142–1147.
32. Parker, K., Horowitz, J. and Minkin, R. (2020) *How the Coronavirus Outbreak Has – and Hasn't – Changed the Way Americans Work*, Pew Research Center, 20 December
33. Ralph, P., Baltes, S., Adisaputri, G., Torkar, R., Kovalenko, V., Kalinowski, M., Novielli, N., *et al.* (2020) "Pandemic Programming: How COVID-19 affects software developers and how their organizations can help", *Empirical Software Engineering*, Vol. 25 No. 6, pp 4927–4961.
34. Schaufeli, W.B., Bakker, A.B. and Salanova, M. (2006) "The Measurement of Work Engagement With a Short Questionnaire: A Cross-national Study", *Educational and Psychological Measurement*, Vol. 66 No. 4, pp 701–716.
35. Sharma, S. (2020) "Industries Thriving During The Pandemic", *Forbes*, 18 December, available: https://www.forbes.com/sites/forbestechcouncil/2020/12/18/industries-thriving-during-the-pandemic/?sh=13eb24537a03 .
36. Stanton, J.M. and Weiss, E.M. (2000) "Electronic monitoring in their own words: an exploratory study of employees' experiences with new types of surveillance", *Computers in Human Behavior*, Vol. 16 No. 4, pp 423–440.
37. Tangen, S. (2005) "Demystifying productivity and performance", *International Journal of Productivity and Performance Management*, Vol. 54 No. 1, pp 34–46.
38. Tietze, S. and Nadin, S. (2011) "The psychological contract and the transition from office-based to home-based work", *Human Resource Management Journal*, Vol. 21 No. 3, pp 318–334.
39. Torten, R., Reaiche, C. and Caraballo, Ervin.L. (2016) "Teleworking in the new millennium", *The Journal of Developing Areas*, Vol. 50 No. 5, pp 317–326.
40. Toscano, F. and Zappalà, S. (2020) "Social Isolation and Stress as Predictors of Productivity Perception and Remote Work Satisfaction during the COVID-19 Pandemic: The Role of Concern about the Virus in a Moderated Double Mediation",*Sustainability*, Vol. 12 No. 23, p 9804.
41. Turetken, O., Jain, A., Quesenberry, B. and Ngwenyama, O. (2011) "An empirical investigation of the impact of individual and work characteristics on telecommuting success", *IEEE Transactions on Professional Communication*, Vol. 54 No. 1, pp 56–67.
42. Tustin, D.H. (2014) "Telecommuting academics within an open distance education environment of South Africa: More content, productive, and healthy?", *International Review of Research in Open and Distance Learning*, Vol. 15 No. 3, pp 185–214.

43. Vega, R.P., Anderson, A.J. and Kaplan, S.A. (2014) "A Within-Person Examination of the Effects of Telework", *Journal of Business and Psychology*, Vol. 30 No. 2, pp 313–323.
44. Virick, M., DaSilva, N. and Arrington, K. (2010) "Moderators of the curvilinear relation between extent of telecommuting and job and life satisfaction: the role of performance outcome orientation and worker type", *Human Relations*, Vol. 63 No. 1, pp 137–154.
45. WHO. (2020) "WHO Director-General's opening remarks at the media briefing on COVID-19", *World Health Organization*, 11 March, available: https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020
46. Yang, L., Holtz, D., Jaffe, S., Suri, S., Sinha, S., Weston, J., Joyce, C., *et al.* (2021) "The effects of remote work on collaboration among information workers", *Nature Human Behaviour*, available: https://doi.org/10.1038/s41562-021-01196-4.
47. Zweig, D. and Webster, J. (2002) "Where is the line between benign and invasive? An examination of psychological barriers to the acceptance of awareness monitoring systems", *Journal of Organizational Behavior*, Vol. 23 No. 5, pp 605–633.