

INCREASING ONLINE SHOPPING IN THE COVID-19 PERIOD AND HEALTH EFFECT ON COURIERS

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Abstract: Background: It covers all of the studies aimed at minimizing work-related risks and accidents and increasing productivity in courier companies in accordance with occupational health and safety procedures. This study aims to reveal the difficulties experienced by courier employees in terms of their effects according to various factors related to the safety situation and risk perception, to increase occupational safety, to reduce occupational accidents and to explore the difficulties encountered during the COVID-19 pandemic process. Materials and Methods: This study is a systematic review using the meta-analysis method of international studies to obtain data on the safety status and accident risks of courier drivers. Databases were used to collect national and international articles and papers that could be associated with the safety of the couriers and the risks of accidents. The data obtained are categorized as characteristics of courier drivers, working environments, safety risks and occupational accidents, delivery process and COVID-19 process. The result: An increase in trade, an increase in couriers as people turn to online orders, and the fact that this increase showed an accumulation during the COVID-19 process revealed that these have had a negative impact on the working conditions and occupational safety of courier drivers as. In this vein, the fact that e-trace showing a rise in many areas and people preferring online orders have escalated the need for couriers. Furthermore, the pandemic process particularly has had a negative effect on the working conditions and work safety of couriers.

Keywords: courier workers, occupational health and safety, covid-19, time pressure, work accidents

1 INTRODUCTION

A unity of the effects of rising population, economic mobility, urbanisation, and the changing structure in employment, the consummation basis of contemporary society is

shaped, and this situation causes demands to take place on convenience food sector (Özdemir,2017). With advancement in logistics firms and a population rise on smart phones, trade has had a rapid increase. The rise that occurred in logistics sector, convenience food

sector, and e-trade has shown a drastic increase in online shopping and parcel delivery; this situation, on the other hand, brought about a rise in the number of couriers making deliveries (Özdemir,2017; de Oliveira et al.,2021; Gruenwald,2020).

For the seasons that couriers are more flexible and practical in the traffic, make more manoeuvres in narrow streets, and are easily parking have increased the importance of the motorcycle and made it a preferable choice. Particularly in crowded cities, it can be seen that they are preferable as they are practical for the rising demands in in-city deliveries (Kriyakierne & Laesanklang, 2020; Papakostopoulos & Nathanael,2021).

This increase that took place in trade has taken a sharp turn during the COVID-19 period, and this situation has negatively affected the job security and working conditions of courier drivers. The study aims to evaluate hardships, risks, and time pressure that courier drivers face and how this situation is reflected in the COVID-19 period. Rise of online food service has caused massive traffic, and it was observed that the number of the accidents that included food delivery passengers has shown a sharp rise (de Oliveira et al.,2021; Parwez,2022; Qin et al.,2021). The fact that parcel deliveries generally take place during busy hours, in crowded avenues and intersections, in densely-populated places such as trade centres affect the driving habits of courier drivers; and it can be understood that this situation causes fatal accidents. It was determined that crossing at red light and improper lane changes are most frequently seen, and tendency to violate traffic rules is observed to take place mostly at intersections (Qin et al.,2021).

2 METHODOLOGY

This study is research conducted through meta-analysis method. On the first phase, key words were written on the search engines;

there was a database search on the internet sources and sufficient literature is obtained. 24 articles, analyses, questionnaires, research, interviews, and observations were obtained. In the second phase, the collected papers were summarised and evaluates within the context of the present study.

Research questions below are answered in the present study:

1. What are the features of drivers in courier companies and what factors that affect the job security and accidents of work conditions?
2. What are the security risks of time pressure that affect the courier drivers during the delivery?
3. How did the rising online shopping that has risen during the COVID-19 period affect the security of courier drivers?

3 RESULTS FEATURES OF COURIER DRIVERS

It was observed that an apparent rise took place in the volume of parcel deliveries after the COVID-19 period; and it was understood that the major problem for drivers are the security accidents that happen during the delivery (Park et al,2021). The factors that elevate the accident risk are drivers not using personal protection gear, driver's age, gender, lack of experience, speed and training, violation of traffic rules, condition of the road, environmental factors, and driving manners (Kriyakierne & Laesanklang, 2020). The most widespread risk factors are age, driver's experience, time pressure, and inadequate protective gear (Parwez, 2022).

3.1 Workforce Feature – Gender

Upon examining the gender of participants in the examined articles, it was seen that approximately 237 are women (10,42%) and 2037 are men (89,58%) among 2274 people.

Table 1 shows that men are thought to be suitable for the qualities of the job, and men are observed to have a dangerous driving tendency (Lachapelle et al.2021).

Table 1. Genders of people working as couriers

Workforce Feature/ Gender	Number		Article
	Women	Men	
	6	390	6
	37	780	10
	26	93	22
	48	432	9
	114	318	8
	6	24	20
TOTAL	237	2037	

3.2 Age

Upon examining the ages of the participants in the articles, it was seen that approximately 505 are 30 years old or less (36-22%), 40 are between 30 and 40 (2,86%), 271 are between 40 and 60 (19,44%), 195 are between 31 and 45 (13,98%), and 383 are 25 years old or more (27,47%).

Table 2. Age of people that work as couriers

Age	Number of People	Article
30 and less	505	(1,6,8,22,12,5)
30-40	40	(6,22,12)
40-60	271	(6,8,22,12)
31-45	195	8
25 and more	383	(1,5)
TOTAL	1394	

The fact that majority of people working in this sector are young stems from being suitable for the quality of the job (Uçar et al.2006). The most frequent factor among risk factors is that workers are at a young age; and it was understood that young drivers tend to experience more time pressure than older

drivers (Parwez,2022). Young couriers have a higher tendency to violate traffic rules; older drivers tend less to violate traffic rules (de Oliveira et al.,2021). Accident and deaths that take place as a result of events involving inexperienced or young couriers have become an issue of public health (Lachapelle et al.2021).

It was seen that 24,1% of the injured couriers are under 30 years old, 26,5% are in their 30s, 24,3% are in their 40s, and 25% are seen to be above the age 50 (Kriyakierne & Laesanklang. 2020).

Table 3. General features of couriers involved in accidents

		Nr.of People	Total	Article
Age	30 years old and less	163	668	13
	30-40	174		
	40-50	163		
	50 years old and more	168		
Post-accident condition	Resulting in death	14	671	
	Resulting in disability	86		
	Resulting in injury	571		

Hence 75% of the injured couriers younger than 50 years old. In this vein, young couriers are found to violate traffic rules and involved in more accidents (Kriyakierne & Laesanklang. 2020; Buncaras et al.2022). 76,5% of the drivers were involved in accidents at least once (Wang et al. 2021).

3.3 Experience

Approximately 824 individuals' experience has been examined in the articles that were included in meta-analysis. 92,3% of the drivers who had an accident did not complete the safety education, and it was understood that majority of these is experienced by drivers with little experience (Park et al., 2021). The average

working year of drivers is 5.8 years (Uçar et al.2006). 56% of the drivers, more than half of them, has job experience more than 2 years, 25%, however, have had a serious accident (Huang, 2022). 47.9% have less than a year of experience, and 8,4% have 1-5 years of experience (Park et al.2022). Half of the workers are experienced for less than a year (Buncaras et al.2022).

Table 4. Experience of people working as courier drivers

Experience	Number of People	Article
More than 1 year	118	16
Less than 1 year	186	22,12,16
Between 1-3 years	15	12
Between 1-5 years	10	22
Between 4-10 years	8	22,12
Between 10 years	53	22,12
2 years and more	244	5
Less than 2 years	190	
TOTAL	824	

47,2% of the injured couriers have less than 6 months of experience, 53,3%, however, have less than 1 year job experience; and drivers who have less than 6 months of experience have a higher ratio of violating traffic rules, nonetheless, likely to have more compliance to

rules as they have more job experience (Kriyakierne & Laesanklang. 2020).

Violation of traffic rules is in proportion to lower job experience; the fact that young and amateur drivers have less awareness is linked to careless driving or risk in terms of Personal Protective Gear (Huang,2022).

Moreover, experienced drivers are suggested to be role models for drivers who are careless and informing the public. It is thought that experience and seniority would be helpful to provide road safety (Lachapelle et al.2021). It is understood that it is the first experience in their work life for 80% of the drivers (Buncaras et al.2022).

3.4 Education

37% are higher education graduates and 62,3% are not higher education graduates (de Oliveira et al. 2021). In addition, it is seen that educated and older individuals tend less to violate traffic rules, and married individuals are more considerate about this subject.

Table 5 present the results obtain, approximately 824 individuals' experience has been examined in the articles that were 38,2% of the drivers graduated from secondary school, 38,2% either from high school or university (Uçar et al.,2006).

40% of the drivers in 2020 and 38% in 2021 had a low educational background (Cheng et al.2021); 58% of the drivers are high school graduates, 17% obtain vocational adequacy document, and 25% are either higher education graduates or undergraduates (Buncaras et al.2022).

Table 5. Educational feature of courier drivers

Education	Number of People	Article
Without a diploma	316	10
University graduate	197	
Without a primary school degree	58	6
Primary school graduate	59	
Highschool graduate	172	
Highschool dropout	49	
BA degree graduate	49	
Vocational school graduate	23	
Primary school graduate	44	1
Secondary school graduate	66	
Highschool and university graduate	66	
Highschool graduate	137	16
Vocational adequacy	40	
University graduate	60	
TOTAL	1336	

3.5 Work Time and Travel Distance

The average distance that a courier driver travels daily is 200 kilometres, and they work for 10 hours on average in a day (Uçar et al.2006). In addition, long hours of work necessitate attention and awareness for couriers. 92% of the drivers travel more than 100 kilometres and, thus, their daily work hours are too much; and 81% are working for more than 8 hours (Pap et al.2021). 85,6% work for 6 days a week and 46,5% are working for more than 8 hours in a day (Gruenwald,2020).

4 WORKING CONDITIONS OF COURIER DRIVERS

Lack of workers caused by the rising number of food deliveries present courier company personnel with various work opportunities; however, particularly in busy periods, delivering multiple items on time leads to time pressure and dangerous driving, and thus, travel time becomes a risk factor. This situation shows that working conditions are defined as unsafe conditions (Papakostopoulos & Nathanael,2021; Qin et al.2021; Parwez,2022).

The fact that earnings of couriers depend on delivery numbers cause time pressure on couriers, and this situation makes working conditions unsafe (Pap et al. 2021; Wang et al.2021; Krityakierne & Laesanklang, 2020). According to Huang (2022) and Pap et al. (2021), pay for work system has caused a busy working tempo, long hours without a break, high work stress, exhaustion, unsafe driving manners (violation of traffic rules), and shown that the working conditions are poor. If the delivery time exceeds the time limit, there occurs a decline in platform delivery wages or monetary punishment: it shows that courier income is in line with the successful delivery numbers (Pap et al.2021; Aguilera et al.2022). Furthermore, the stress stemming from completing parcel numbers on the maximum level causes drivers to move fast and negatively affects their present driving skills. This situation leads drivers to risky behaviour (red light, line change, driving in the wrong lane etc.). According to Aguilera et al. (2022) and Gruenwald (2020), the fast delivery which is required from drivers that work on commission cause working fast and risks, which leads drivers to choose to take shortcuts or dangerous streets in order to make a fast delivery. Krityakierne & Laesanklang (2020) this situation makes drivers to enter narrow streets with high speed, violate traffic rules, and make risky behaviour. In addition, in order to take more orders and receive delivery

confirmation, drivers show risky behaviour to communicate with the customers by using telephones in traffic (Gruenwald,2020).

Condition of the vehicle, road conditions, and weather conditions during the work hours are among the anxiety factor for drivers (Huang,2022; Lachapelle et al.2021). While factors such as weather conditions and being exposed to environmental factors raise accident risks for drivers, factors such as fast delivery and paying options according to delivery number cause unsafe actions, all of which, when combined, become extra stress for couriers (Huang,2022). The fact that couriers drive vehicles during delivery times increases the risk of becoming involved in an accident. 30,6% of the accidents take place at intersections, 30% in places where there are no proper roads (Kriyakerne & Laesanklang, 2020). Upon examining the weather conditions when couriers had an accident, 77,2% of the couriers had their accident on a cloudy day, 22,8% had theirs on a snowy or rainy day. behaviour of colleagues and other drivers in traffic have an effect on couriers (de Oliveira et al.2021). the effort for delivering the orders on time in extremely hot weather or rainy weather is more difficult for making the delivery in negative weather conditions; this situation puts workers who are trying to make a delivery in danger (Lachapelle et al 2021). Moreover, constantly being in traffic and bad road condition (pits, ice, bumps, water puddles etc.), fast driving for fast delivery expectations by customers, and spending long hours on the vehicle as part of the job description show that riding a motorcycle is risky and unsafe.

Apart from traffic accidents, delivery drivers also face sliding, falling, and jamming problems during work, and with weather conditions added to these, couriers risk their safety. Long working hours cause exhaustion and raises the accident risk. Apart from the stress factor, upon considering extra load and long working hour factors, it becomes inevitable

to be exposed to ergonomic risks, which is seen to bring about muscle-skeleton disorders (Buncaras et al.2022).

One of the hardships of working conditions is fake orders. Parcels delivered on time despite the bad weather conditions and the traffic turning out fake can cause belated deliveries to other customers along with complaints. Apart from difficult working conditions, customers who order and then cancel or try to trick couriers by enforcing a fake reservation, and possible punitive situation couriers might face propose risks on couriers. Sectors that provide courier service develop marketing strategies for more income. However, there may be hardships for deliveries to distant areas because of frequent orders. In addition, customers making wrong orders because of lack of experience in ordering make delivery processes even more difficult. In this vein, the responsibility lies with restaurant owners; however, the courier company and restaurant owners need to establish an order by coordinating the orders to supply the customers with the right need. Nonetheless, many companies hold couriers responsible for the economic loss of the fake order; couriers of some companies experience both economic and time losses in such situations (Lachapelle et al.2021).

Even though flexible and free working hours look appealing to courier workers, giving reports about the conditions, difficult working conditions particularly because of long work hours, the pressure of being checked, and low income despite these conditions constitute unsafely in working conditions. Risky behaviour of couriers and work-related factors of accidents dwell on various reasons. Factors such as the distance travelled for delivery, too many awaiting orders, job experience, city knowledge, kind of the work shift (full time, half time, seasonal etc.) cause risky actions and accidents. Exhaustion caused by long hours spend on the road for deliveries, the frequent

need to use a smart phone, and traffic violations to save time make workers susceptible to traffic accidents; according to observation done on intersections, crossing at red light is the most frequent risk action to be observed. Since no qualifications are wanted for employment, it is easy to quit, and because of poor working conditions, it is understood to be a high cost and temporary job. Although the delivery distance is short, 73% of the workers complain about high accident risk. It is understood that ¼ of the workers have had an accident during the delivery, also 79% stated that they see road safety and accident risks as threats (Cheng et al.2021).

4.1 *Safety Risks and Work Accidents Of Courier Drivers*

It is seen that accident ratio because of a number of reasons and exposure to risks for courier drivers while they are working are high (Qin et al.2021; Buncaras et al.2022; Pap et al.2021; de Oliveira et al.2021; Aguilera et al.2022).

Multiple tasking that couriers do such as being on the road for a delivery, the need to check the address information (not knowing all addresses, finding the address etc.), making contact with the customer, and having to do all these at the same time to complete the delivery cause distraction; and this leads couriers to have accidents and propose a threat to the road safety (Qin et al. 2021; Aguilera et al.2022; Lachapelle et al.2021).

Courier drivers show dangerous actions by speeding in order to save time, make up the fast performance expected from them, keep up to the long and disorganized working hours and workload, raise their pay by making more deliveries, and to provide customer satisfaction. This situation means that couriers face more traffic, display dangerous actions (running, jumping stairs etc.), experience exhaustion, be under stress, and increased risk factors (Qin et

al.2021; Buncaras et al.2022; Pap et al.2021; Aguilera et al.2022).

Drivers being frequently exposed to traffic forms driving experience for couriers; this situation causes them to exaggerate their skills and abilities, thereby turning into a risky situation (Qin et al.2021). Accidents take place because courier drives violate traffic rules according to traffic reports (de Oliveira et al.2021). Violation of traffic rules is in line with time pressure (Huang,2022); and majority of the accidents that couriers had stems from lack of rest (Uçar et al.2006). The fact that working hours are long and disorganised, payments are irregular and competition pressure reveal the lack of safety measures. Apart from inadequacy of supervision and training, this situation shows that job health and safety are ineffectual. Because of employment being insecure and temporary, the job his high risks and accident rates are also high. In order to prevent occupational diseases, accidents, and deaths that occur under these conditions, precautions that dwell on Control Hierarchy can be taken into consideration. It was observed that majority of the working couriers frequently dodged accidents and again majority of them sustained injuries that prevented them from working. Thinking that being a courier is a temporary job and that the job is unsecure show that accident ratios and being exposed to risks have a high potential.

Doing the job as free-lance, without observation, and apart from other workers cause exposure to be less in terms of security protocol and a low degree of information adequacy (Aguilera et al.2022).

It can be seen that stress factor has a significant effect on works in terms of secure actions. Workplaces obtaining awareness in terms of safety and a safe work environment have appositve effect for workers to show safe actions. However, safe action affects work environment relatively. In addition, job stress negatively affects safe actions. It is seen that

security awareness has a positive effect on safe actions, and the better the safety system is, the safer the worker will be (Park et al.2022).

The fact that couriers have less awareness for road safety and self-preservation (Gruenwald,2020); traffic violation, busy traffic hours and days, and bad weather conditions (Parwez,2022); carelessness that is caused by long working hours (50%) and not paying attention to drivers cause accidents and injuries (Uçar et al.2006).

According to Krityakierne & Laesanklang, (2020), 2,1% of the couriers that had an accident resulted in fatality, 12,8% resulted in disabilities. Accidents that took place because of traffic violation are high among fatal accidents; (Uçar et al.2006), the ratio of fatal accidents are between 20-40%; for this reason, 34% of them resulted in couriers being away from work. 34,6% was observed to be using telephones (Gruenwald,2020).

Courier drivers show dangerous actions while using intersections and have a tendency to cross at red light (the ratio of crossing at red light is 78,93%) (Qin et al.2021). drivers often use the centre line to move forward and violate the speed rule (Parwez, 2022). 91,3% of them do speeding, 23,3% cross at red light, 17% drive in the opposite direction, and 18,5% use telephones (Gruenwald,2020).

It was seen that the first accident of the courier drivers take place within the first year (Uçar et al.2006). 90,2% of them had a traffic accident, 90% had a job accident while delivery; one worker in three stated that they had an accident that required sick leave. 70% of the courier drivers have had injuries since the day they started work, and 55% of these checked at a hospital (Aguilera,2022).

Wearing a helmet is disregarded since wearing it before each delivery causes time loss (71%), restricts the sight when customers called (18%), causes thermal disturbance (5%), and others (6%) (Huang,2022). The ratio of the use of wearing a helmet is 68,8% (Gruenwald,2020).

Upon examining the size of companies that employ courier drivers, it was understood that 49,2% of the couriers who had an accident work for a company with 5 or less workers; 31,6% have 5 to 14 workers; and 17,8% have more than 15 workers. It was also observed that the accident ratio for companies that employ less people is relatively high (Krityakierne & Laesanklang, 2020).

4.2 *Delivery Process of Courier Workers: Time Pressure*

Courier companies have gained importance with the increase in e-trade today. Making deliveries in the traffic density caused by rising population has proven to be difficult process for couriers.

According to Lachapelle et al. (2021), orders appearing momentarily in the courier system (at work, in the street etc.), also couriers displaying dangerous actions such as looking for the address on the internet as they do not know it, the anxiety to make the delivery on time in terms of customer satisfaction, and coping with the traffic on top of these make the job a difficult process for couriers.

Gruenwald (2020), hasty behaviour caused by fast delivery among couriers brings about violation of traffic rules, which displays that couriers are violating the traffic rules. It was understood that speeding and crossing at red lights appear frequently. That is why, while determining delivery duration, safety of the drivers should be taken into consideration.

Huang (2022), time pressure leads to risky behaviour during the delivery and violation of traffic rules. Workers with a busy work tempo are required to make fast deliveries instead of paying attention to safety; and 65% of the workers stated that health and safety policies are inadequate in their job.

It can be understood that couriers experience time pressure to make deliveries on time while delivering parcels, and that workers

do not receive training for the job (Qin et al.2022). That is why it is observed that their tendency to be involved in accidents is high.

Commission taken per delivery and a work system based solely on being paid on commission show that their earning is based on the number of deliveries they make.

Particularly, in order to make a fast delivery, workers are encouraged to work on commission; being fast leads to hasty work and risk, thereby creating an unsafe situation. In addition, it also involves using narrow streets and shortcuts instead of safe streets in order to make a fast delivery.

This leads drivers to have a high speed in narrow streets, violate traffic rules, and display risky actions (Pap et al.2021; Krityakierne, & Laesanklang, 2020). They display traffic rule violation and risk behaviour such as crossing an intersection without caution (Aguilera et al.2022).

The fact that motorcycles are cheap and have high manoeuvre ability has risen their use; and this is in direct proportion to the rise in fast delivery demand.

According to Cheng et al. (2021), risks and safety issues found while working are linked to negative working conditions; and this situation is understood to cause an intense time pressure. It can be seen that the time pressure made for an on-time and a fast delivery leads to couriers using illegal carrying methods.

4.3 Effects Of Covid-19 Period On Courier Drivers

Instead of the job losses that took place because of the pandemic, courier delivery was seen as a solution, and the fact that the pandemic has negative effects on the courier workers is highlighted. In addition, reasons such as rising health risks, poor working conditions, formation of unsafe conditions, insecurity brought about with the rising finance, relatively less payment for working long hours

have caused security deficits during the pandemic (Cheng et al. 2021).

Upon examining the effects problems in online shopping delivery applications on persons and suppliers, it was understood that generally 51% of the customers are very displeased, and 24,4% of them experienced incomplete deliveries or issues about cold food arriving warm, and warm food arriving cold.

Apart from negative circumstances such as having to drive under bad weather conditions and driving in the traffic and dangerous roads, courier drivers also faced stressful, upsetting, and difficult conditions with the effect of Covid-19 pandemic.

The fact that couriers are at the forefront during the pandemic period threatens both their health and psychological state with the difficult working conditions. The fast spread of the virus caused restrictions in countries; this situation, on the other hand, caused a steep rise in the workload of couriers who deliver food and meals. Couriers, who have worked in the forefront during the pandemic, have an importance for people, and they have been working under hard circumstances such as under the rain, stormy weather, and traffic. Covid-19 pandemic process has caused a sense of exhaustion in people and workers (Lachapelle et al. 2021).

Courier workers come face to face with customers who do not put on masks or demand online payment during the delivery, therefore having to accept risks in order to preserve their customer satisfaction points.

The demand for the on-time delivery makes them enter crowded and physically narrow environments regardless of time and place. Since courier workers work with a low income and their sick days are not financed, they even have to work although they carry symptoms of Covid-19 virus. This situation is seen to be proposing risks on both workers and customers (MacEachen et al. 2021).

The fact that food delivery workers are acting fast regardless of the time and place for food shopping ordered by customers with the anxiety of being on time because of the application algorithm proposes the risk of workers coming face to face with the Covid virus. In order to make deliveries for people who live on apartments on higher floors, courier workers have to avoid waiting for an empty one and get on crowded lifts in order to make a delivery on time; this leads to workers coming face to face with Covid-19 (MacEachen et al. 2021).

It was understood that the stress and exhaustion of courier workers is related to their long hours of work and spending too much time on the road; this, in turn, was seen to be causing unsafe actions and muscle-skeleton disorders.

It was understood that there has been an increase in the stress factor during Covid-19 period; 37% of the workers stated that they experienced a muscle or skeleton pain at least once, 13% had a traffic accident, 10% experienced stress at least once in a week.

This process asserts that the stress level has increased in 60%. The fact that Covid-19 spread quickly has dramatically risen the demand for couriers.

This situation, in turn, highlighted the risk of courier drivers being exposed to the virus and spreading it to other people.

During and after the pandemic, 46% of the workers stated that their work became busier in terms of workload, 19% was less busy, and 35% stated that there was not a change in their workload.

In addition, 21% of the workers stated that they have adapted to the regulations imposed during the pandemic period, 38% adapted to them partially, and 27% could not adapt to the regulations. It was determined that individuals who were married and had children had a higher ratio of adapting to regulations (Buncaras et al. 2022).

5 CONCLUSIONS

The communication between customers and couriers has become to prove problematic in the delivery of orders during the Covid-19 period. The fact that online orders are sharply increasing and people choosing online shopping have revealed how important parcel delivery is.

In this period, the increase of online trade started to become a problematic between couriers and customers; and taking into consideration the changing sense of shopping in society, it is thought that making the deliveries via drones would minimize the risk of the spread of virus (Shin et al. 2019). In addition, the service drone, which will be used to make deliveries with a low cost, is economic and fast, thereby making these drones suitable for deliveries. Indeed, first drone was used around Singapore Island to carry 2 kilograms of vitamin; and it was understood that drones are a suitable choice for fast, suitable, and risk-free delivery in addition to the fact that they can be used in open sea regardless of a route.

Research to make advanced drones that travel for longer distance and longer time are still going on, and it is through that they are a good delivery tool for energy conservation (Yaprak et al.2021).

Giving licence training to the drivers could be effectual to decrease accidents. Wearing a helmet, making industrial regulations to make drivers' travel safe, obeying the speed limit, using reflective equipment, and introducing additions to traffic rules could be taken into consideration (Gruenwald, 2020).

It was understood that majority of individuals working as couriers are people from rural places where inadequate education in traffic rules is seen; therefore, risk knowledge and safety awareness should be encouraged for these individuals (Qin et al. 2021). We could prevent traffic violation actions by encouraging educational programs on couriers, application

of traffic rules and regulations (de Oliveira et al. 2021).

Couriers should be equipped with applications and equipment that are developed to decrease the use of telephone and navigation during the food delivery. A GPS alarm can be installed. In addition, workers can have awareness through pre-work and danger notice education (Qin et al. 2021).

Performance evaluation is a system that is designed to give on-time delivery guarantee to the customer; and loss of being late is higher than the income of on-time delivery. Income system is in proportion to the success of more food deliveries that are successful and within the time limit. Income and loss should be balanced for couriers to make safe and stress-free choices, and the order amount should be limited. Firstly, steps should be taken in order to decrease the time pressure on couriers because of safety reasons (Qin et al. 2021).

Sudden actions speeding courier drivers make in narrow streets and shortcuts in order to make more deliveries pose an accident risk. It was understood that a low level of road safety knowledge and self-protection awareness lead to accidents and injuries. Sudden situations particularly courier drivers run into on the road while making deliveries pose a risk. In this vein, a test drive was practiced for sharp turns, intersections, and roads with a high risk of traffic accidents, and it was found out that eyes are the organs that best reflect individuals' emotional state (worry, anxiety, calmness etc.). Sensory and danger perceptions in eye movements of drivers in unexpected and sudden situations during travel were measured.

According to the results of these measurements, equipment can be installed in vehicles that can interfere momentarily as a result of interaction with the courier's vehicle during the drive, thereby turning them into smart vehicles. This can be made by integrating eye movements into courier vehicles, and it can function as a warning system. Thus, it can be

beneficial for providing the safety and road safety for drivers (Lachapelle et al. 2021).

Defined as the final phase of the trade, delivery can also be named as lost mile logistics; and it can be seen that it is of significance since a courier has to make fast decisions particularly in the busy traffic, and thus, having made the route analysis contributes to preventing time loss during the delivery to a great extent. In this situation, by integrating traffic information to route organisation in terms of time, the time issue can be solved. When the driver obtains the route knowledge, he would be able to make healthy and fast decisions in extremely busy traffic or in route changes that occur stemming from traffic accidents that take place in the area.

Route balance can be taken into consideration in order to balance the work duration in unexpected situations. Heuristic routing method is initially applied according to monochorionic traffic information.

The real vehicle time is obtained by updating the traffic duration that are on the travel spots on the map, which is the solution obtained by monochorionic traffic information. It is thought that route solutions obtained by regulating the vehicle working duration parameter can decrease the total time loss, and a better route balance can be achieved through real time traffic information (Wang et al. 2021).

It was observed that individuals' behaviours are highly effectual on their intentions; and it was seen that saving time during the delivery is important. It was understood that the more successful deliveries are the higher the income of individuals.

In this vein, precautions taken to prevent violations in traffic would change individuals' actions. For instance, strengthening the time pressure safety method for couriers and attempting to make delivery durations acceptable would change workers' attitude (de Oliveira et al. 2021).

BIBLIOGRAPHY

- Aguilera, A., Dablanç, L., Krier, C., & Louvet, N. (2022). Platform-Based Food Delivery In Paris Before And During The Pandemic: Profile, Motivations And Mobility Patterns Of Couriers. *European Transport Research Review*, 14(1), 1-9. doi: 10.2139/ssrn.4020181
- Buncaras, Z., Trucilla, L., Rodriguez, K., Ayapana, M., Interia, J., Gumapas, A., & Martin J.(2022).Food at Speed of a Click: The Experiences and Challenges Faced by Food Delivery Riders Amidst the COVID-19 Pandemic. *International Journal of Psychology and Counseling*. doi: 10.6084/m9.figshare.18583961.v1
- Cheng, Q., Deng, W., & Hu, Q. (2021). Using The Theory Of Planned Behavior To Understand Traffic Violation Behaviors In E-Bike Couriers In China. *Journal Of Advanced Transportation*, 2021. 0-11. doi: 10.1155/2021/2427614.
- De Oliveira, L. K., de Oliveira, I. K., Nascimento, C. D. O. L., Cordeiro, C. H. D. O. L., Meira, L. H., Rabay, L., & da Silva, F. G. F. (2021). Identification Of Factors To Improve The Productivity And Working Conditions Of Motorcycle Couriers In Belo Horizonte, Brazil. *Case Studies On Transport Policy*, 9(4), 1737-1745. <https://doi.org/10.1016/j.cstp.2021.09.003>
- Gruenwald, H. (2020). Parcel Delivery Services boom during Covid-19. Search in. Available online: https://www.researchgate.net/profile/Hermann-Gruenwald/publication/343674544_Parcel_Delivery_Services_boom_during_Covid-19/links/5f37d517458515b7292288b3/Parcel-Delivery-Services-boom-during-Covid-19.pdf
- Huang, H. (2022). Riders On The Storm: Amplified Platform Precarity And The Impact Of COVID-19 On Online Food-Delivery Drivers In China. *Journal of Contemporary China*, 31(135), 351-365.
- Krityakierne, T., & Laesanklang, W. (2020). Heuristic Route Adjustment for Balanced Working Time in Urban Logistics with Driver Experience and Time-Dependent Traffic Information. *Applied Sciences*, 10(20), 7156. doi:10.3390/app10207156
- Lachapelle, U., Carpentier-Laberge, D., Cloutier, M. S., & Ranger, L. (2021). A Framework For Analyzing Collisions, Near Misses And Injuries Of Commercial Cyclists. *Journal of Transport Geography*, 90, 102937. doi: 10.1016/j.jtrangeo.2020.10293717.
- MacEachen, E., Majowicz, S., Meyer, S., Durant, S., Hopwood, P., Crouch, M., & Parthipan, M. (2021). Covid-19 Risks Faced By Ontario Digital Platform Couriers And Recommendations For Enabling Safer Work.
- Özdemir, Akın. "Tüketim Toplumunda Müşteri Memnuniyeti ve Çalışanların İş Güvenliği: Moto-Kuryeler Üzerine Bir Alan Araştırması." *SEÇME YAZILAR* (2017): 249.
- Pap, J., Makó, C., & Miklós, I. (2021). Pandemic as a Driver of Diversification of the Bolt Platform: Launching Food Courier Service in Budapest. Available at SSRN 3909289.
- Papakostopoulos, V., & Nathanael, D. (2021). The Complex Interrelationship Of Work-Related Factors Underlying Risky Driving Behavior Of Food Delivery Riders In Athens, Greece. *Safety and health at work*, 12(2), 147-153.
- Park, H., Jeong, M., Jeong, R., & Heo, J. (2021). Correlation Analysis of Factors Influencing the Safety Behavior of Distribution Center Workers. *The Journal of the Convergence on Culture Technology*, 7(4), 155-161.
- Parwez, S. (2022). COVID-19 Pandemic And Work Precarity At Digital Food Platforms: A Delivery Worker's Perspective. *Social Sciences & Humanities Open*, 5(1), 100259.
- Qin, H., Wei, Y., Zhang, Q., & Ma, L. (2021). An Observational Study On The Risk Behaviors Of Electric Bicycle Riders Performing Meal Delivery At Urban Intersections In China. *Transportation Research Part F: Traffic Psychology And Behaviour*, 79, 107-117.
- Shin, D. S., Byun, J. H., & Jeong, B. Y. (2019). Crashes And Traffic Signal Violations Caused By

- Commercial Motorcycle Couriers. *Safety And Health At Work*, 10(2), 213-218. doi: 10.1016/j.shaw.2018.10.002.
- Uçar, M. S., Bakırcı, N., & Harmancı, H. (2006). İstanbuldaki Motorsikletli Kuryelerde İş Kazası Niteliğindeki Trafik Kazaları. *Türk Tabipleri Birliği Mesleki Sağlık ve Güvenlik Dergisi*, 25, 48-52.
- Wang, Z., Neitzel, R. L., Zheng, W., Wang, D., Xue, X., & Jiang, G. (2021). Road Safety Situation Of Electric Bike Riders: A Cross-Sectional Study In Courier And Take-Out Food Delivery Population. *Traffic Injury Prevention*, 22(7), 564-569. doi: 10.1080/15389588.2021.1895129.
- Yaprak, Ü., Kılıç, F., & Okumuş, A. (2021). Is The Covid-19 Pandemic Strong Enough To Change The Online Order Delivery Methods? Changes In The Relationship Between Attitude And Behavior Towards Order Delivery By Drone. *Technological Forecasting and Social Change*, 169, 120829.