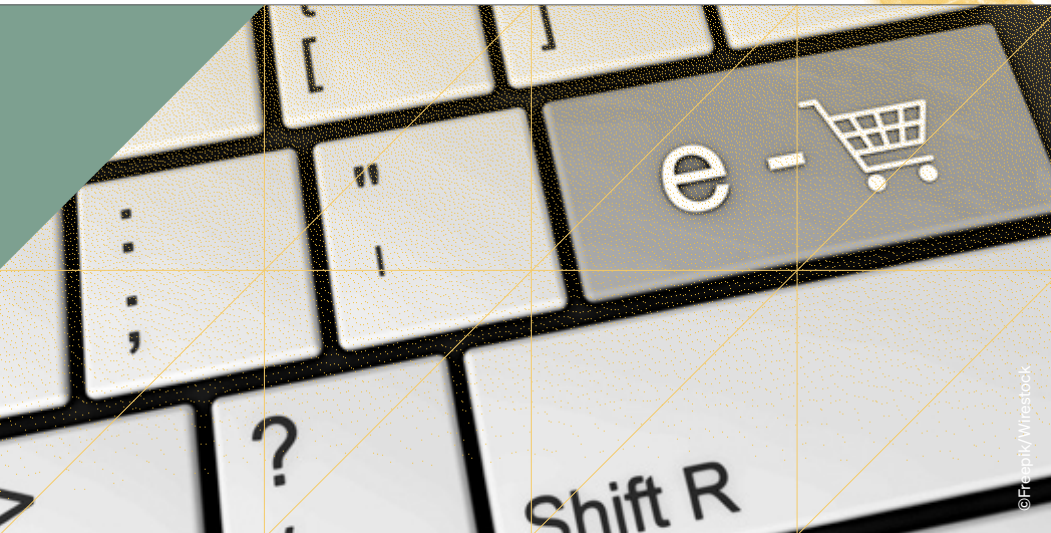




EVOLUTION OF FOOD E-COMMERCE DURING THE COVID-19 PANDEMIC



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Food e-commerce has skyrocketed since 2020. According to McKinsey & Company, the COVID-19 pandemic “squeezed ten years of digital sales penetration into three months” (Bai *et al.*, 2021). Dramatic expansion was already predicted before the pandemic hit, with Euromonitor International estimating e-commerce would account for more than half the overall global retail sector 2020–2025 (Evans, 2021). In fact, a radical change in consumer food demand patterns towards convenience and time-saving shopping had already been helping e-commerce penetrate the food industry, including the fresh fruits and vegetables (FFV) market. Yet, even though a spike in e-commerce had occurred during China’s 2003 outbreak of Severe Acute Respiratory Syndrome (SARS), the boom accompanying COVID-19 produced – and continues to present – unexpected challenges and opportunities.

In the context of lockdowns and other measures to reduce spread of COVID-19, e-commerce became a fundamental means of food distribution. This contributed to making food supply chains more resilient in the face of the pandemic’s disruptive effects, especially for mature food economies. While its pace of expansion fluctuates, the e-commerce growth trend is not reversing as restrictions

ease and it continues to drive a profound transformation of the retail sector. This is proved by the emergence of new actors, services and business models, which are not yet fully regulated and still undergoing a process of adaptation and consolidation.

Drawing from an analysis produced by the Food and Agriculture Organization of the United Nations and the European Bank for Reconstruction and Development (FAO and EBRD, 2022), this brief discusses the rapid surge and evolution of e-commerce, with special focus on the sale of FFV. The brief provides policy recommendations and identifies strategies and key areas of investment that are necessary for the sustainable development of FFV e-commerce. Governments, particularly urban authorities, must create a conducive institutional, regulatory and business environment to maximize e-commerce opportunities, while reducing its adverse impacts on the urban traditional retail sector and minimizing effects such as traffic congestion and the emission of greenhouse gases (GHG).

Retailers must also invest to upgrade their business models for e-commerce, reorganize supply chains and establish efficient and environmentally-sustainable systems for the delivery of local and healthy food products.

The emergence of food e-commerce and its rapid rise during COVID-19

Food e-commerce first emerged in China and other Asian countries in the 2000s, and increased substantially during the 2003 SARS outbreak. In mature food economies, it grew quickly in the 2010s, which is when it also began to appear in transitional food economies. This early growth in food e-commerce was driven by:

- increasing consumer demand for convenience and time-saving shopping;
- young consumers familiar with online tools via computers, laptops, tablets and smart phones;
- growing consumer access and trust in the security of online payment systems;
- more efficient payment systems and processes;
- SARS-related lockdowns in 2003 (Asia), which enhanced demand for online purchase of FFV.

Box 1

Key terms

Modern retailer: Supermarkets, hypermarkets (superstores combining supermarket and department store), discounters, and convenience stores with highly integrated and digitalized supply chains they themselves organize on a large scale. Expansion of modern retail, which has been the dominant model in mature food economies since the 1960s, has been more rapid for processed and semi-perishable foods than for FFV. In mature food economies, modern retail accounts for more than half total FFV retail in terms of both volume and monetary value (FAO and EBRD, 2022).

Traditional retailer: Relies on multiple and highly fragmented supply chain actors working on a small scale. Even in mature food economies such as France and Italy, traditional retail remains an important distribution channel for FFV.

Mature food economy: Characterized by strong household income, population that is more urban than rural, many modern retailers; i.e. generally Western Europe and the United States of America.

Transitional food economy: Characterized by lower household incomes, growing share of urban population, fewer modern retailers.

E-commerce: Purchasing done online by computer, laptop, tablet or smart phone. Product is delivered to the consumer by the retailer or third party delivery service, or may be picked up by the consumer.

Quick-commerce (q-commerce): Smaller volumes delivered to the consumer within an hour or so of being ordered online, usually to supplement weekly food purchases (Nierynck, 2020).

Omnichannel marketing: Business model that strives to create a seamless shopping experience across physical stores, websites, and mobile apps with customer interaction via phone, email, webchat and social media.

Click & collect: Purchases made online are delivered to an intermediate point (e.g. curbside or other location) to be picked up by the consumer, in which case the item is considered semi-delivered.

Dark store/micro-fulfilment centre: Mini-logistics hub in high-density urban area to quickly prepare/fulfil customers' online orders, better enabling same-day delivery or pick up.

Home delivery: Purchases made online are delivered directly to the consumer's home or office, in which case the item is considered fully delivered.

Hyperlocal delivery: Limited to a particular geographic area. Retailer's in-house driver or a third party delivers item to customer within one or two hours of ordering.

Last-mile delivery: Final leg of an elaborate fulfilment process to transport an item from a central hub to the customer.

COVID-19 and impacts on retailers

- COVID-19 did not drive consumers away from modern retail but led them to minimize shopping far from home, often opting for smaller and quicker modern retailers or click & collect purchasing modalities.
- Small (traditional) shops were disadvantaged as they faced the surging, ‘newly proximate’ e-commerce.
- Local green markets were better able to survive due to their proximity, the support they received from delivery services that emerged during the pandemic and the general consumer preference for purchasing FFV in person to check quality and freshness.

Source: FAO and EBRD. 2022. *COVID-19 pandemic package: evolution of food distribution systems – The resilience pathway* Rome.

Development and diffusion of food e-commerce, including for FFV, accelerated rapidly due to COVID-19. Lockdowns and mobility restrictions forced consumers to resort to online shopping at massive levels, including for food products. Even as such measures have been relaxed, shoppers – now more familiar with online platforms – continue to enjoy the convenience of e-commerce. The expansion of e-commerce has also been facilitated from the supply side by increased investments from major e-commerce players, modern and traditional retailers, large delivery intermediaries and third-party logistics (3PLS).

Yet, there is a down side. Since its inception, food e-commerce has been disrupting physical retail, especially as it expanded from large urban centres to small towns. This has been accelerated by COVID-19, bringing about a systemic change and contributing to a true revolution in the retail sector.

Findings from Euromonitor highlight the growth of e-commerce across many countries 2019–2020 (Vardhan, 2020). Brazil, China, India, Indonesia, Mexico, Nigeria and South Africa all saw a dramatic surge in e-commerce in 2020 compared to 2019. Nevertheless, e-commerce is only at the emerging stage in most transitional countries such as: India, Indonesia, Malaysia, Thailand, the Philippines, and Viet Nam (Asia); Bulgaria, Hungary, Poland, Romania, Russian Federation, and Ukraine (Central and Eastern Europe); Argentina, Brazil, Chile, Colombia, Mexico, and Peru (Latin America); and Egypt, Morocco, Nigeria, Saudi Arabia, South Africa, Türkiye and United Arab Emirates (Near East and North Africa) (Reardon et al., 2021; Rees, 2021). The trend towards e-commerce is expected to increase across all regions, especially Latin America (Figure 1).

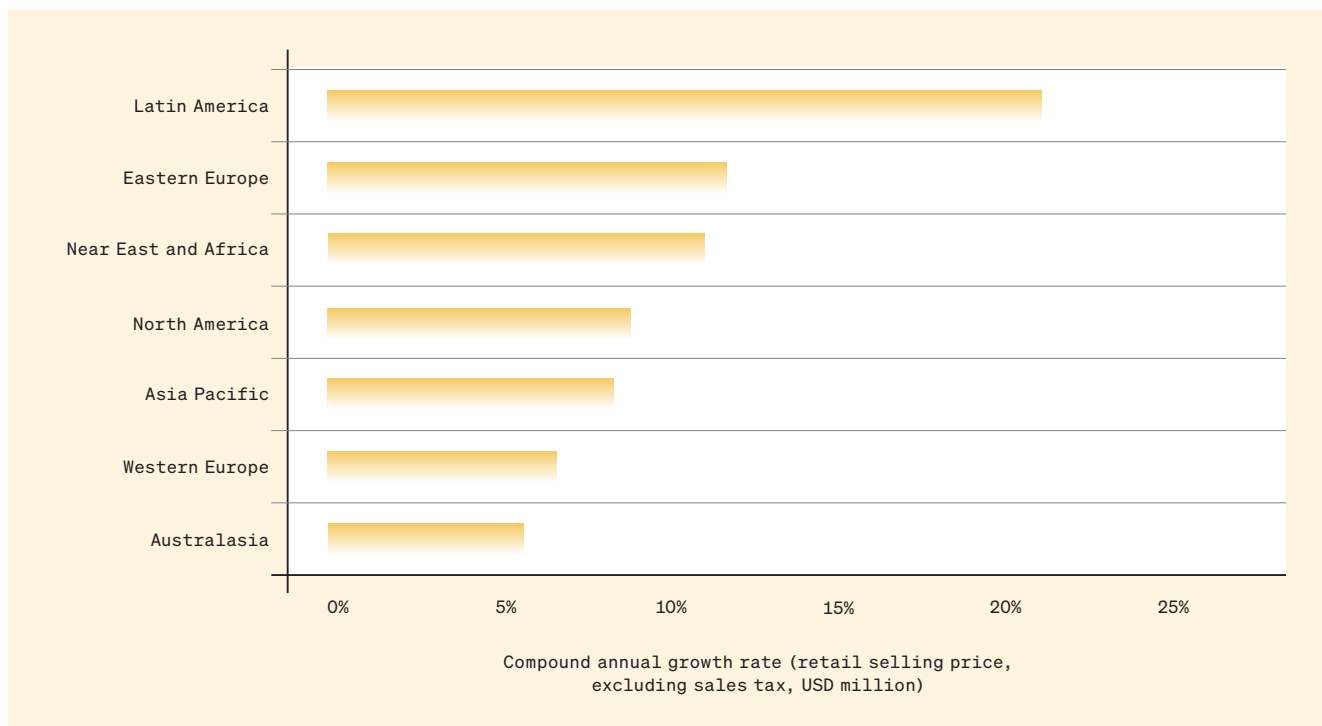


Figure 1
E-commerce annual growth rate by region (2020–2025)

Source: Euromonitor International. 2021. Retail in Transition: Future E-Commerce Opportunities in Western Europe. In: *Euromonitor International*. London. Cited 9 November 2022. www.euromonitor.com/retail-in-transition-future-e-commerce-opportunities-in-western-europe/report



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Globally, online grocery sales stand at about USD 50 billion, as opposed to modern retail store sales at about USD 1.5 trillion and traditional grocery sales at about USD 600 billion. The value in e-commerce of snacks plus dairy over 2015–2020 grew from USD 7.5 billion in 2015 to USD 22 billion in 2020, with year-on-year growth at 15 percent in 2015 versus 50 percent in 2020.

Data confirm that global e-commerce will continue to grow as COVID-19 restrictions ease: the share of 'digital

consumers' buying groceries increased from around 48 percent in 2020 to 54 percent in 2021 (Figure 2).

From 2019 to 2021, global food and beverage e-commerce increased by 86 percent in terms of USD. In 2021, online purchases accounted for 18 percent of total retail purchases globally – the highest share ever. Data also show the growth of click & collect modalities as opposed to traditional delivery, although they do not specifically refer to groceries.

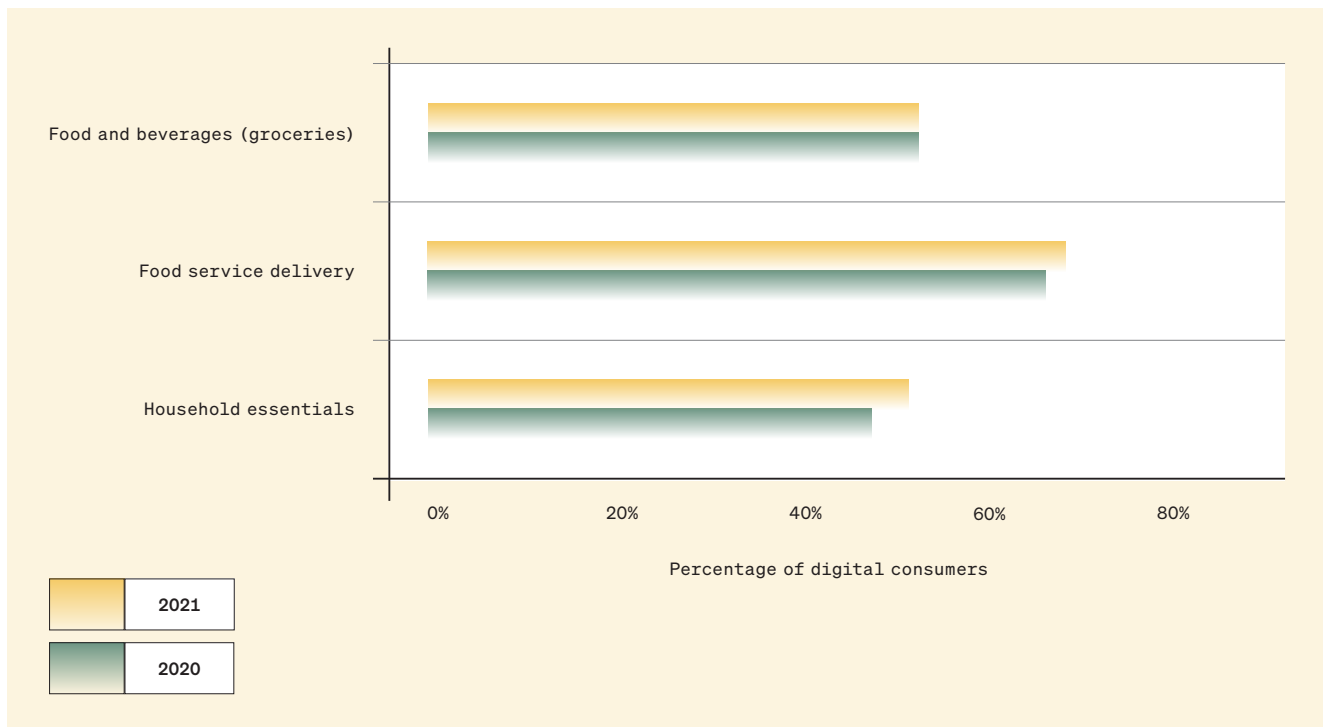


Figure 2
Global food-related online purchases by product category 2020–2021

Source: Euromonitor International. 2022. Top Five Digital Consumer Trends in 2022. In: *Euromonitor International*. London. Cited 9 November 2022. www.euromonitor.com/top-five-digital-consumer-trends-in-2022/report?recid=1975545501462&id=749880

Table 1**Food e-commerce and food delivery service providers, where and when founded, and countries serviced**

Company name	Foundation year	Foundation place	Countries of operation	Service scope
Bolt	2013 (as Taxify or Txfy)	Estonia	45+	Vehicles for hire (e.g. bicycles, e-bicycles, electric scooters), car-sharing, food delivery.
Deliveroo	2013	United Kingdom of Great Britain and Northern Ireland	11	Food delivery.
Delivery Hero	2011	Germany	50+	Food delivery.
DiDi	2012	China	16	Provides transportation services including ride- and bicycle-sharing and on-demand delivery.
DoorDash	2013	United States of America	6	Online food ordering and delivery platform.
Getir	2015	Türkiye	9	On-demand delivery services for grocery items and restaurant food.
Glovo	2015	Spain	25	On-demand courier that purchases, picks up and delivers products ordered via its mobile app.
GoPuff	2013	United States of America	3	Delivers convenience store items, e.g.: snacks, beverages, toiletries, baby products such as diapers, pet supplies.
Gorillas	2020	Germany	7	Specializes in home shopping delivery.
Grubhub	2004	United States of America	1	Online food ordering and delivery platform. Acquired by Just Eat Takeaway (the Netherlands) in 2021.
Jiffy	2021	United Kingdom	1	Initially founded as a rapid grocery delivery service, Jiffy ceased its operations in 2022 to become a dedicated rapid delivery software provider.
Just Eat Takeaway	2020	Netherlands	22	Online food ordering and delivery.
Meituan	2015	China	1	Online shopping platform for local consumer products and services. In 2020, Meituan launched its Youzuan segment for community group-buying, pooling together residents to purchase groceries and other essentials in bulk at a discount. Each community leader aggregates orders via WeChat and distributes locally.
Rappi	2015	Colombia	9	On-demand delivery service.
Uber Eats	2014 (as UberFresh)	United States of America	45	Online food ordering and delivery platform.
Wolt	2014	Finland	23	Online delivery platform for food and merchandise. Acquired by DoorDash in 2022.
Zakaz	2010	Ukraine	2	Online ordering and grocery delivery. Acquired by Glovo in 2022.

Source: Authors' own elaboration.

Note: Data was collected in 2021/2022. Since the sector is constantly evolving, the countries of operation may have or may change.

COVID-19 and the impulse to innovate

The pandemic prompted retailers to develop and adopt new services and delivery options to reach consumers, often in partnership with major e-commerce players and emerging new actors, especially in quick-commerce (q-commerce). Examples include the partnership between French food retailer Casino Guichard-Perrachon and Germany's Gorillas delivery; and companies that were not previously servicing the food sector, such as Glovo's entry into grocery delivery. Modern retailers that had either already integrated e-commerce into their omnichannel strategies before the pandemic or had the capacity to do so swiftly once it began adapted rapidly and even benefitted from the COVID-19 e-commerce surge. This pandemic-induced adaptation is permanently shifting business models as demand for ultra-convenience in purchasing and delivery becomes a systemic change (Box 3, Box 4).

Constrained by limited financial and operational capacities, traditional retailers were initially disadvantaged in adapting their processes to e-commerce. This is changing, thanks to the multiplicity of delivery and other service providers that emerged prior to and during the pandemic in direct response to greater demand for their operational support. While there are some domestic delivery start-ups, the global market is dominated by a few international firms such as Bolt, Delivery Hero, Glovo, Uber Eats and Wolt (Table 1).

Post-pandemic, small retailers will likely either expand business operations, merge with competitors to achieve economies of scale, or specialize in niche products (e.g. organic, local, etc.) to compete with the major or emerging e-commerce players. Meanwhile, some e-commerce firms, particularly multinational companies, have already begun consolidating their operations.

Box 3

Accelerated growth of e-commerce in major cities

Belgrade: Experienced a general surge of food e-commerce 2020–2021, mainly among modern retailers and large e-commerce firms.

Casablanca: During the first half of 2020, merchant sites and invoicing sites carried out 6 million online payment transactions worth 2.9 billion Moroccan dirham, an increase of 31.3 percent in transactions and 23.6 percent in value compared to 2019. Before COVID-19, 10 percent of consumers purchased FFV online as opposed to 26 percent during COVID-19.

Istanbul: In 2020, e-commerce operations of the leading modern retailer (Migros) expanded to 81 provinces as online sales and customers tripled compared with 2019. Some non-food e-commerce retailers added FFV to their offerings. Companies such as Migros, Carrefour and Getir enhance their delivery capacity.

London: Most supermarkets had already been investing in e-commerce with home delivery or click & collect, the pandemic merely accelerated the process. Responding to the higher COVID-19-related demand, some leading retailers entered into joint ventures with delivery intermediaries, as Marks & Spencer and Morrisons did with online grocer Ocado. Tesco, another online grocer, had 1 million new customers using e-commerce during the pandemic, with 700 000 still shopping online in 2021 (Radojev, 2021). Delivery intermediaries such as Deliveroo greatly expanded operations and several hyperlocal delivery firms were established in 2021, such as Gorillas and Getir.

Paris: Internet food buyers increased by 20 percent during the lockdown and the share of food purchased online reached 32 percent (APUR, 2021). Online grocer La Belle Vie hired 200 people to cope with increased operations during the first lockdown and – during a single month – achieved 40 percent of the prior year's total gross revenue (i.e. EUR 4 million in one month in 2020 compared with EUR 10 million for all of 2019).

Rome: Online sales of FFV increased by 127 percent from July 2019 to July 2020 and grew 40 percent from 2018 to 2019 (Istituto di Servizi per il Mercato Agricolo Alimentare, ISMEA, 2021). The total value of all food e-commerce increased by 117 percent from 2019 to 2020.

Tashkent: Food e-commerce grew with the delivery cooperation between LeBazar and Korzinka. The Ukrainian food delivery company Zakaz entered the market in 2020; Zakaz established partnerships with the Makro and Carrefour chains. As of November 2022, Zakaz is no more active in the Uzbekistan market.

Tbilisi: Sopidan, the leading food e-commerce company, increased its online sales by 400 percent and its online customer base by a third. Overall, e-commerce grew 3.2 times between 2019 and 2020, reaching 1.1 percent of total retail sales of food and non-foods (Investor.ge, 2021). In the first lockdown, demand for online delivery increased 500 percent compared to the previous year. The Nikora supermarket chain developed click & collect using Facebook Messenger.



A NEW KIND OF COMMERCE: Q-COMMERCE

While disrupting the retail sector and accelerating the expansion of e-commerce, COVID-19 also stimulated the emergence of a third generation of commerce: quick commerce or q-commerce (Figure 3). Here, instant grocers offer quasi-immediate delivery to complement weekly food needs in a fast and convenient way. While e-commerce's standard order cycle for food products takes one to two business days and is serviced by large warehouses, q-commerce relies on dark stores (a.k.a. micro-fulfilment centres) – hyperlocal infrastructures strategically situated closer to consumers –

to package and deliver smaller volumes in under an hour. This requires impeccable logistics; most items spend less than a day in warehouses. Since order volumes are smaller, two-wheeled vehicles (bicycles, e-bicycles, scooters), rather than trucks, can be used for last-mile delivery. The number of dark stores grew dramatically due to COVID-19 as distribution centres exclusively for online shopping, but they also facilitate click & collect services, in which customers pick up the items they have ordered online (Nierynck, 2020; Delberghe et al., 2022).

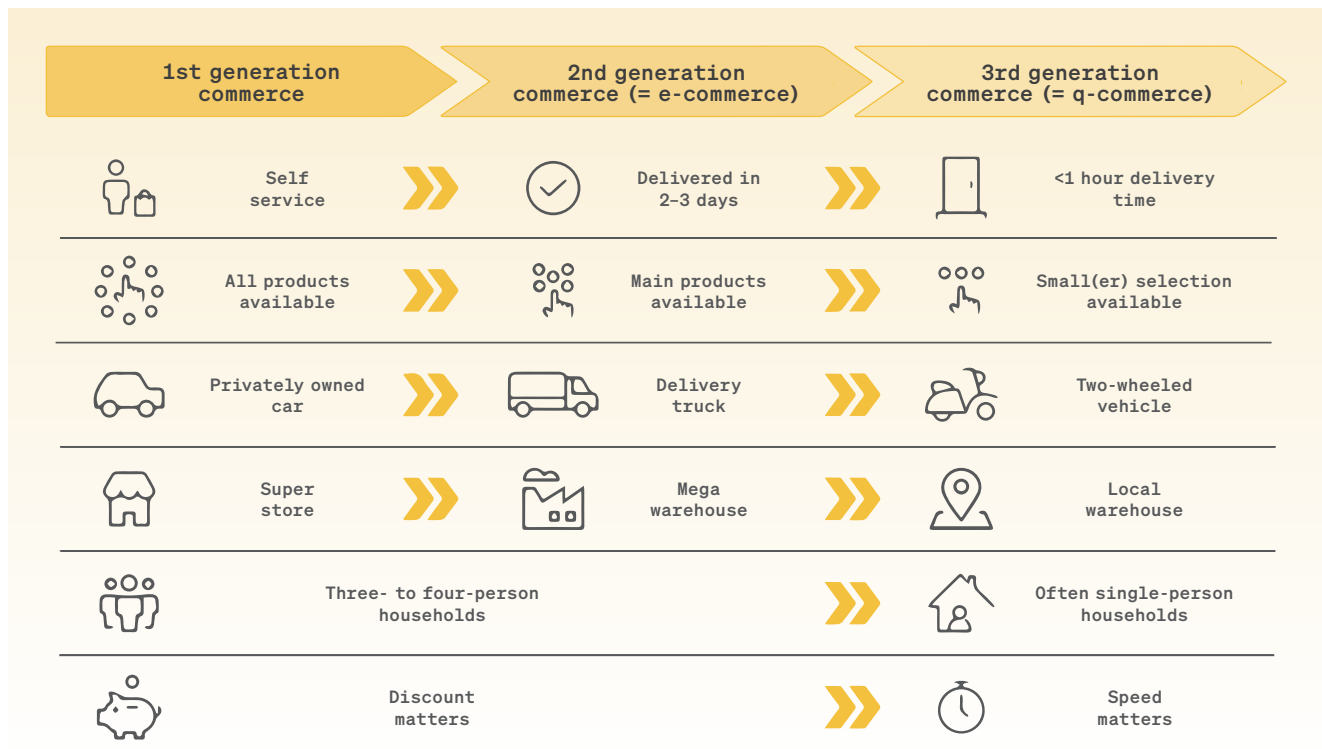


Figure 3
Evolution of commerce

Source: Delivery Hero, 2020. Q-commerce: pioneering the next generation of delivery. In: Delivery Hero. Berlin. Cited 25 August 2022. www.deliveryhero.com/blog/quick-commerce/

Recent developments in q-commerce services and companies

- Milan-based start-up Macai is Italy's largest grocery delivery provider. It picked up EUR 2.6 million in outside investment in November 2021, aiming to become the main player in Southern and Central Europe.
- Spanish flower delivery start-up Colvin launched a q-commerce in partnership with the on-demand delivery platform Glovo.
- In the United States of America, Walmart has introduced Walmart+, which offers same-day delivery of any product available at Walmart's brick-and-mortar locations, including grocery items.
- Schwarz Gruppe, a major retail group that owns Lidl, has acquired Real.de, one of the largest online marketplaces in Germany, selling everything including groceries.
- German Delivery Hero acquired online grocery marketplace InstaShop for USD 360 million to expand grocery delivery in the Near East.
- Cajoo, a Paris-based start-up building an e-commerce business for grocery home delivery, attracted USD 40 million in outside investment.
- Some brick-and-mortar companies partnered with q-commerce instant delivery services (e.g. the recent partnership between Casino and Gorillas in France).

Source: Ragusa, S. 2021. Quick commerce, che cos'è il commercio veloce e le startup che l'hanno lanciato. In: *Network Digital360*. Milan, Italy. Cited 9 November 2022. www.economyup.it/retail/quick-commerce-che-cos-e-il-commercio-veloce-e-le-startup-che-lhanno-lanciato/

As much as 67 percent of European consumers used dark store retail formats during the pandemic (OneStock, 2021). A survey shows that 33 percent of customers across France, Germany, the Netherlands and the United Kingdom of Great Britain and Northern Ireland value instant-grocery shopping because of its ultra-convenience. Consumers see instant-groceries as a solution for immediate needs (26 percent), and for impulse purchases (18 percent) (McKinsey & Company and EuroCommerce, 2022).

The q-commerce market has grown tremendously throughout the pandemic, with nearly USD 6 billion invested in dark convenience stores globally (McKinsey, 2022). Currently, one of the leading online grocery delivery firms is the German start-up Gorillas. Players such as Gorillas entered the market by offering q-commerce as their core service, whereas others such as Getir, Uber Eats, Delivery Hero, DoorDash, Meituan and Rappi integrated q-commerce into their existing business models and scaled it up on their own or through franchising, acquisitions, or partnerships. Unicorns – start-ups with valuation greater than USD 1 billion – offering ultra-fast food delivery are also growing in number.

The q-commerce market is challenged by the costs consumers incur for switching brands, products, services or suppliers, as well as by market consolidation and saturation pressures. These affect q-commerce players' profitability and financial sustainability. To remain competitive, some are entering into strategic partnerships with retailers, seeking venture-like investments, making strategic acquisitions, and divesting non-core business model operations (e.g. focusing on software solutions rather than physical delivery). For example, GoPuff postponed its initial public offering (IPO), Gorillas is pulling out of four markets, Jiffy is exiting delivery operations to recast itself as a software development provider for rapid delivery, and Delivery Hero is offering logistics as a service.

Q-commerce negatively affects the environment due to recurrent small-value deliveries (especially those without a minimum order required), which directly impact city congestion while increasing pollution and waste from packaging. Additionally, with FFV share expected to increase in the coming years, q-commerce is also likely to increase urban food waste.

Q-commerce models are still being perfected in terms of financial sustainability and their future is uncertain. Some players are now revising the model to ensure that their investment paybacks are shortened and sustained.





Modern retail leading the food e-commerce transformation

COVID-19 accelerated the pre-existing trend towards an expansion of food e-commerce into FFV in both mature and transitional food economies. This is especially so for FFV e-commerce in mature food economies, due to the dominance of modern retail and the quality and efficiency of their supply chains (Box 5).

FFV e-commerce is just beginning in transitional food economies but will surely grow, given substantial foreign

direct investments (FDIs) and the growing number of service providers for delivery and e-commerce platform solutions (Table 1). Supply chain inefficiencies and quality issues common in these countries will likely be addressed through business model adaptations, partnerships and targeted investments, which may be supported financially by international development partners.

Box 5

Hybrid models and social media to promote online sale of FFV

- Amazon began FFV retail when it entered the grocery business with its 2017 purchase of Whole Foods, a retailer specialized in organic and premium products. Amazon paid more than USD 13 billion to purchase this 40-year-old supermarket chain to develop grocery sales online combined with physical retail. This hybrid arrangement proved successful for Amazon's development of FFV e-commerce (Costich, 2017).
- Alibaba set up its Hema Fresh retail chain with both physical stores of high-quality FFV and online shops offering hyperlocal delivery. Each aims to serve a customer base within a 3 km radius. This hyperlocal approach means that customers can shop at home using the mobile app and receive their order within 30 minutes, including ready-to-eat meals cooked by Hema chefs. Hema Fresh is targeting at least 2000 stores across China to join the network by 2022 (Saiidi, 2018; RetailNews Asia, 2019; Bloomberg News, 2022).
- Grand Frais supermarket chain in France already had a reputation for quality FFV. It set up Mon-Marché.fr as an online extension and a business model for FFV home delivery (Saint Vincent, 2022).
- Tesco publicized its customers' satisfaction with click & collect purchasing of FFV as a strategy to show quality (Wood, 2022).
- In China, multichannel network companies like TikTok are supporting FFV e-commerce firms through live broadcasts, involving farmers or influencers to encourage online purchases of FFV.

Integrating food e-commerce: opportunities and challenges for small and medium retail enterprises

Small and medium enterprises (SMEs) – from farmers to specialized stores – in the traditional retail sector are strong competitors to FFV e-commerce players because traditional FFV shopping offers consumers the opportunity to see, taste, touch and smell fresh produce before purchasing it. Traditional players also have an important social function in highly populated cities as meeting and gathering places.

The main factors restricting the ability of SMEs to adopt e-commerce include: the limited human, technical and financial resources at their disposal; substantial start-up costs, particularly those associated with adoption of the app; integrating the online platform into existing business processes; engaging with delivery firms and the delivery

process itself; SME's inherent aversion to risk; and increasing competition from larger players.

During the pandemic, SMEs that adopted e-commerce gained an advantage over those that did not. However, these success stories tended to be among the top tier or 'elite' shops and municipal market stalls. Meanwhile, some adopted e-commerce without an accompanying operational strategy, which damaged their image, created dissatisfied customers, and negatively influenced e-commerce development in the sector. Over the next decade, it is likely that large e-commerce firms and supermarkets selling FFV online will continue to gain market share from SMEs, leading to a consolidation among SMEs entering the e-commerce business.



The way forward: sustainable investments and policy recommendations

CHALLENGES TO THE E-COMMERCE TRANSITION IN URBAN FOOD DISTRIBUTION SYSTEMS

Integrating e-commerce into urban food distribution systems requires overcoming significant challenges. These include potential risks associated with increasing traffic, pollution and food waste as FFV online purchases and delivery services expand.

Socioeconomic impacts

- Disruption of the retail sector at the expense of SMEs and the traditional sector (urban, open-air markets and specialized stores).
- Threat to urban centre vitality and reducing social interactions between inhabitants.
- Poor working conditions for delivery actors and couriers, including traffic accidents.

Environmental impacts

- Increased vehicle traffic, worsening congestion in dense urban centres.
- Increased packaging and lack of solutions for grouping products for delivery.
- Q-commerce exasperates congestion and packaging issues even further through its frequent delivery of smaller volumes.

Urban infrastructure and last-mile logistics

- Urban infrastructure not adapted to retail sector transformation, requiring improved urban logistics areas, dark stores, pickup areas and an urban logistics masterplan.
- Lack of space for logistics activities in city centres and outskirts.
- Need to modernize existing infrastructure, especially wholesale food markets (WFMs), and to support innovative solutions while protecting urban environments and livelihoods.

Need for retail sector regulation and urban investment planning

- Develop appropriate standards for monitoring, reporting and verifying GHG emissions in food distribution.
- Support resilience of urban food supply by diversifying distribution channels.
- Support new business models in the traditional retail sector to accommodate e-commerce integration (e.g. development of omnichannel business models).

Transitioning to e-commerce: areas of investments for retailers

E-commerce for the FFV sector will increase sharply in the next decade, calling for sustainable financial and environmental models of development. Investing in these six areas will help retailers – especially traditional SMEs – integrate e-commerce to benefit from the growing consumer demand for online shopping.

Set up integrated fulfilment networks

- Establish aggregation centres in peripheries, possibly by repurposing under-utilized or abandoned infrastructure.
- Invest in urban logistics, micro-fulfilment centres and dark stores to support the delivery process, consulting with urban population and public/private actors to reduce negative impacts.
- Automate backend operations to obtain the operational visibility required to integrate essential functions (e.g. picking and distribution).

Strengthen and diversify the delivery capacity of retailers

- Invest in or upgrade enterprise resource planning (ERP) systems for all types of retailers, including SMEs, to

- handle accounting, procurement, project management, risk management and compliance, and supply chain operations.
- Invest in or upgrade software solutions (stand-alone solutions if ERP systems are not used, or software modules that can be easily integrated into ERP systems) to control inventory management, delivery scheduling, and picking and routing to make delivery more customized and responsive to consumers.
- Enter into business partnerships with delivery firms.
- Establish click & collect arrangements rather than home delivery, especially for FFV.
- Especially for SMEs, individual farmers and producer organizations, implement cooperative arrangements (e.g. delivery vehicle pooling) or leverage existing facilities (such as WFMs).
- Enhance management of delivery preparation and storage centres, e.g. through the creation of off-site warehouses or dark stores.

- Diversify delivery modalities with complementary options based on different customers, types of FFV, traffic situations and delivery speed requirements and using a variety of transportation means, preferably green transportation options.
- For SMEs in particular, use platforms such as Facebook and Google Pay to facilitate rapid adoption of e-commerce while minimizing investment and operational costs.

Optimize digital payment

- Overcome consumer hesitation caused by concerns about online fraud and security through escrow agreements by which an independent third party holds payment until both buyer and seller fulfil their responsibilities.
- Expand retailers' capacity to implement online payment modalities by partnering with reputable payment service providers and adopting flexible payment modalities (cash, credit card or online) while reducing transaction costs.

Support expansion of the online FFV market

- Develop hybrid models for the offline and online sale of FFV (Box 5).
- Develop more value-added products with FFV and invest in packed products of quick, healthy or organic food (e.g. meal kits such as salads, fresh cuts in food boxes or fresh juices).

Adopt environmentally- and socially-responsible practices

- Use energy-saving and low-polluting delivery vehicles (e.g. electric bicycles).
- Adopt sustainable packaging methods, such as gluing, banding, and zipping fruit packs (Schiffmann, 2022).
- Secure supply of green and environmentally-sustainable packaging materials (Escursell *et al.*, 2021).
- Improve working conditions, including through occupational safety and health protection measures.

Creating a conducive business environment for e-commerce

Governments and regulatory authorities recognize that e-commerce has played a key role in keeping food supply chains resilient during the pandemic, particularly during lockdowns. However, they also consider the risks related to traffic, pollution, food waste, and labour compliance.

E-commerce can also be perceived as competing with or even harmful to brick-and-mortar retail, especially SMEs and the traditional sector, which contribute to the vitality of urban centres. There are four steps governments can take to foster e-commerce while addressing its risks.

1

Enhance infrastructure, logistics and transportation to increase business efficiency, reduce transaction costs, minimize risks, and reduce impact on urban areas

◆ Plan and invest to improve flows and efficiencies

- Develop or upgrade existing infrastructure, which may entail widening or reconfiguring roads, bridge placement, or parking spaces for delivery vehicles.
- Optimize urban food distribution plans, including zoning for fulfilment centres and dark stores.
- Develop or repurpose unused spaces in city centres for urban logistic hubs, such as old factory buildings, car parking spaces, and traditional markets that are no longer operating.
- Improve urban traffic flow and transportation systems for increased efficiency of deliveries, for example by creating bicycle lanes for delivery bicycles/e-bicycles, and electric/hydrogen vehicle charging stations.
- Define, enforce and improve the occupational safety and health standards for delivery workers through regulation, inspection and relevant urban infrastructure investments.
- Expand internet and mobile phone connectivity in urban and rural/remote areas while reducing access costs.

◆ Upgrade public WFMs

- Provide space and facilities for e-commerce logistics and aggregation activities.
- Host food operators working in e-commerce support activities.
- Facilitate linkages between leading e-commerce players and traditional sector food operators to achieve synergies and increase local FFV sourcing.
- Facilitate farmers' and farmer groups' e-commerce ventures into business-to-consumer retail by providing sale areas in public WFMs and in parallel programmes such as community collection points and 'farmers' drives' in parking lots etc., where farmers can sell directly to consumers.
- Develop expansion areas dedicated to e-commerce logistics activities and research and development for innovative food services.
- Promote energy-efficient solutions, especially for cold storage to improve shelf life and reduce food waste.
- Promote automation and robotization of operations to increase efficiencies at the WFM level.

2

Enact business practice regulations to counter fraud and discourage anticompetitive behaviour

- ◆ Enact regulations against the unfair and anti-competitive behaviour often adopted by large e-commerce companies.
- ◆ Enact antifraud regulations to make online payments more secure and overcome consumer hesitancy to use them.

3

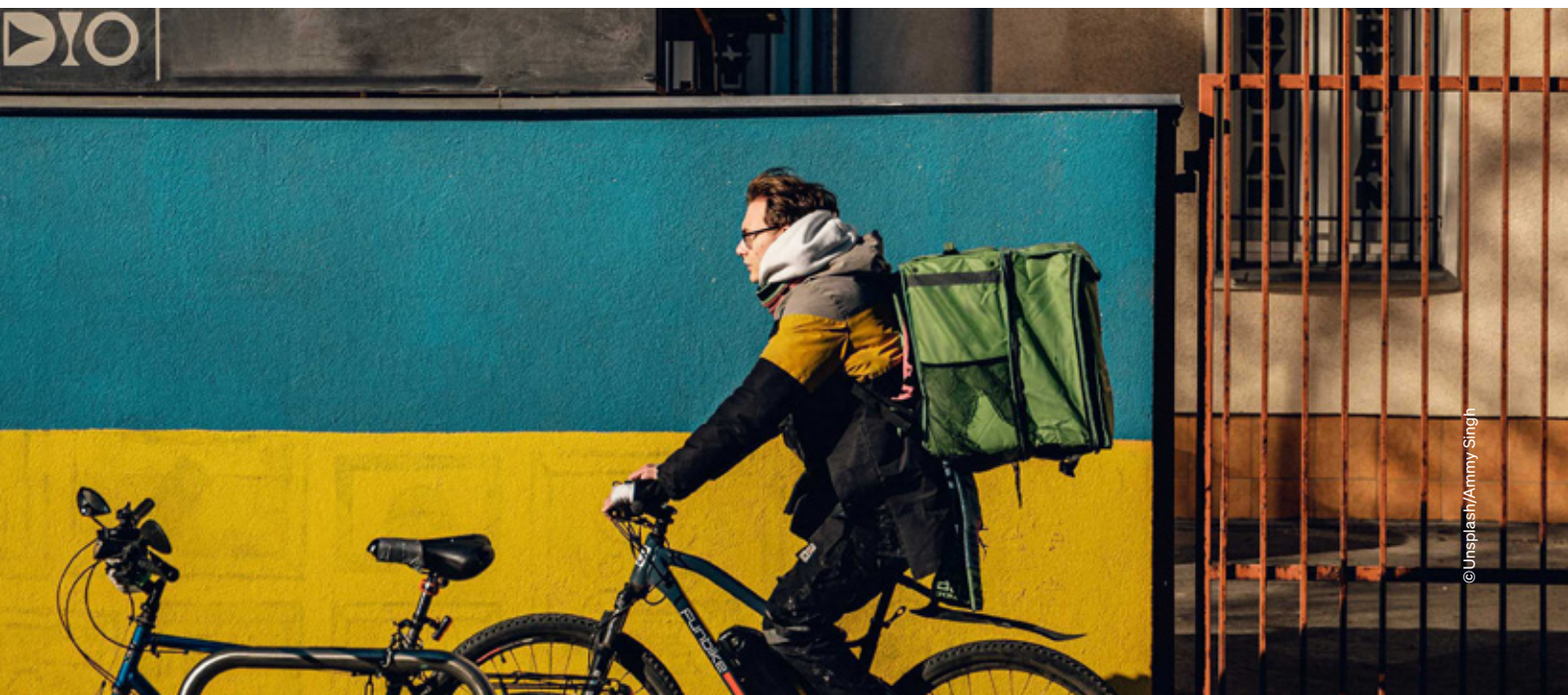
Help retail SMEs supermarkets and delivery services enter the e-commerce sector

- ◆ Build operational capacities and processes such as training employees in e-commerce, and mentoring programmes to support SMEs in developing e-commerce strategies and redesigning their organizational structures.
- ◆ Support the strategic decisions of retailers on adopting cloud-based technologies.
- ◆ Harness FDIs.
- ◆ Formulate policies that incentivize, formalize or increase labour supply to reduce the labour shortages e-commerce firms and delivery companies face.
- ◆ Fast track SMEs' access to licences.

4

Formulate policies and provide tax incentives that maximize adoption of sustainable solutions along the supply chain from producers to consumers

- ◆ Offer tax incentives to firms that use low-polluting vehicles such as bicycles or e-bicycles.
- ◆ Create 'city corners' where consumers can pick up delivered food, and promote green cold storage pickup solutions to preserve freshness.
- ◆ Expand the network of electric and hydrogen vehicle charging stations.
- ◆ Enhance effectiveness of urban waste management practices.
- ◆ Provide subsidies and complementary infrastructure for green public and private infrastructure that interfaces with e-commerce, such as green cold storage.
- ◆ Develop environmental regulations to address the environmental and other negative consequences of q-commerce.
- ◆ Encourage group delivery in urban city centres and use of green packaging.



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Abbreviations and acronyms

3PLS	third-party logistics	GHG	greenhouse gas
EBRD	European Bank for Reconstruction and Development	IPO	initial public offering
ERP	enterprise resource planning	q-commerce	quick commerce
FDI	foreign direct investment	SARS	Severe Acute Respiratory Syndrome
FFV	fresh fruits and vegetables	SME	small and medium enterprise
		WFM	wholesale food market

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