

APPENDIX A

E-COMMERCE – TRENDS AND CONSEQUENCES

In this appendix we present eight observed trends and tendencies from a citizen perspective and elaborate on their impacts and consequences throughout the supply chain. The impacts on and consequences for the supply chain is divided in different components all the way from recipients properties and last mile transports through collection points, retail points and hubs/ terminals to remote transports, warehousing and packaging. A final component is public authorities and city planning. This result in a 8-by-9 matrix. Many of the trends and consequences listed are discussed in the main report.

Trends / tendencies citizen perspective	Impact on / consequences for							
	Recipient properties / delivery points	Local distribution / transports City infrastructure & environment	Pick-up / collection points	Retail points	Hub / terminal	Trunk line / remote transport	Warehousing (& order-picking)	Product packaging (& sourcing)
<p>Broader product range and general increase in volumes through e-commerce</p> <p>General e-com growth due to consumers' techno-maturity, broader range of business areas (incl. oversized and sensitive goods) offering large-scale e-commerce sales, continuous development of user interface and offering/service solutions, etc.</p>	<p>More demands on properties' logistics aspects</p> <p>Parcel boxes in blocks of flats may quickly become insufficient (due to increased amount and size of deliveries)</p> <p>Architectural planning needs to take these aspects into account</p> <p>Ensure function, storage, and handling capacity at delivery interface – incl. return flows and increased waste volumes</p>	<p>Increased traffic load from distribution vehicles and regional road transports (due to growing volumes with poor fill rate)</p> <p>Potential overload of undersized local/city streets</p> <p>Increased emissions (particles, NOx, noise) and worsening carbon footprint</p> <p>Highlights the need to find solutions for innovative, efficient distribution principles and supply chain strategies and design, integrated into city structure</p>	<p>Logistics capacity and efficiency needs to be improved</p> <p>Option 1: increase number of collection points (solves only part of the problem)</p> <p>Option 2: larger and modernised function / technology (solves a broader range of)</p>	<p>Reduced volumes through ordinary retail point results in lower cost effectiveness and risk of increased inventory obsolescence and waste</p> <p>Therefore, potentially fewer local stores &/or introduction of new types of store (e.g. showrooms, pick-up points)</p>	<p>Increasing demands on logistics capacity and facility efficiency</p> <p>Need to consider co-ordination / co-location of various flows, including urban warehousing / e-fulfilment centres for optimised distribution transports (last mile)</p> <p>Challenges current economic models and current stakeholders' roles and relationships (property owners, logistics operators, public authorities, etc.)</p>	<p>Shifting from store replenishment (unit / pallet load transports) to parcel transports to sortation terminals / hubs</p> <p>Reduced fill rates in transports due to parcel handling</p> <p>Results in increased truck kilometres and carbon footprint</p>	<p>Increasing share of order-picking</p> <p>Increased focus on efficient order-picking solutions, including automation</p>	<p>Need to develop smart packaging solutions to reduce waste, enable recycling and re-use</p> <p>More focus on packaging for reliable and efficient logistics – e.g. volume efficiency and packaging robustness</p> <p>Less focus on packaging attractiveness / aesthetics as a means to increase sales</p>
<p>More fresh food / groceries purchased via e-commerce</p>	<p>Need accurate delivery notification or improved drop-off options to delivery box (chilled) or "receptionist / porter" function</p>	<p>Negative effect on fill rate and thus on transport efficiency & environmental impact</p> <p>Due to need for short lead times and accurate delivery windows, which restrict options for optimal route planning</p> <p>Heavier demands on transport vehicles (chill chain)</p> <p>Expected to catalyse other e-com and increase share of home deliveries (reduce share via pick-up points)</p> <p>Drives the need to place new logistics functions closer to delivery destination (urban warehouses with order-picking &/or hubs) and integrated into city block context)</p> <p>This provides options for transport co-ordination / consolidation with parcel distributor</p>	<p>For groceries, collection point is currently primarily at or adjacent to the grocery store – see "Retail points"</p>	<p>Reduced volumes through ordinary retail point reduces operational efficiency and cost effectiveness and poses risk of increased inventory obsolescence and waste</p> <p>Potential merger of grocery store & collection point functions with parcel delivery "hub/ terminal" into one common point in the supply chain, with consolidated transports for home deliveries</p> <p>This would improve distribution efficiency and environmental impact</p>	<p>Drives the need to locate new logistics functions closer to delivery destination (urban warehouses with order-picking &/ or hubs) and integrated into city block concept</p> <p>Grocery distribution is not entirely compatible with hub/supply chain concept – but there is potential for co-location / consolidation with parcel distribution</p>	<p>Transport to new grocery e-fulfilment centres rather than traditional stores will not have a significant impact on these "store replenishment" transports</p>	<p>Grocery order-picking for consumers needs to happen closer to market than general parcel deliveries</p> <p>Drives the need for urban warehouses / grocery e-fulfilment centres integrated into inner-city block context</p>	<p>Potentially, focus on packaging for reliable and efficient logistics – e.g. volume efficiency and packaging robustness</p> <p>Less focus on packaging attractiveness / aesthetics as a means to increase sales</p>
<p>Demand for shorter lead times and accurate delivery / instant deliveries</p>		<p>This should be viewed in a context together with urban warehouses or hubs integrated into the urban environment – e.g. urban property basements</p> <p>Stimulates use of alternative distribution vehicles (bicycles, electric mini-vehicles, drones, etc.) for closely located final deliveries</p> <p>Will also result in traffic heterogeneity</p>	<p>Drives need for urban warehouses</p> <p>May increase number of logistics facilities in the urban area</p> <p>Emphasis on integration of these logistics points into the urban context</p>		<p>Drives the need for hub / terminal / sortation to be located closer to delivery destinations</p> <p>Drives the need for urban warehouses</p> <p>May increase number of logistics facilities in urban areas</p> <p>Integration of these logistics points in the urban context is accentuated</p>	<p>Transport to multiple drops to a greater number of urban warehouses or sortation hubs</p> <p>Off-peak transport into city centre</p>	<p>Drives the need for urban warehouses</p> <p>May increase number of logistics facilities in urban areas</p> <p>Integration of these logistics points in the urban context is accentuated</p>	

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Trends / tendencies citizen perspective	Impact on / consequences for							
	Recipient properties / delivery points	Local distribution / transports City infrastructure & environment	Pick-up / collection points	Retail points	Hub / terminal	Trunk line / remote transport	Warehousing (& order-picking)	Product packaging (& sourcing)
Off-line / “not at home” deliveries	<p>Demands for improved solutions for drop-off delivery</p> <p>Parcel boxes in apartment blocks may quickly become insufficient due greater amount of supplies, larger deliveries, and need for temperature control</p> <p>Architectural planning needs to take these aspects into account</p> <p>Ensure function, storage, and handling capacity at delivery interface – incl. return flows and increased waste volumes</p>	<p>Further digitalisation to allow safe and convenient access to delivery point (door, car, fridge, etc.) and methods for delivery confirmation</p> <p>May reduce the amount of failed deliveries and enable a more optimised route planning compared to normal home delivery and thus somewhat reduce the negative impact of last mile transports.</p>						<p>Need to develop smart packaging solutions for volume effectiveness and packaging robustness</p> <p>Less focus on packaging attractiveness / aesthetics as a means to increase sales</p>
Increased volumes of returned goods and waste	<p>Need to plan and design appropriate in-house functions for product returns and managing increased amounts of waste (especially in blocks of flats)</p> <p>General disadvantage of e-commerce and accentuated by the “buy & try” trend (group of friends buy a large amount of products to try on and return whatever they don't want)</p>	<p>Growing need for cost- and environmentally efficient transport solutions</p>	<p>Growing need for adequate services for returns management</p>	<p>Retail points are often used as possible return points</p> <p>May result in retail sales, but processes need to be developed for further return flows</p> <p>Drives cost, which further worsens retail stores' cost/benefit ratio</p>	<p>Growing need for efficient handling solutions</p>	<p>Growing need for efficient transport solutions</p>	<p>Returns drive complexity and are a significant cost driver in warehouse functions</p> <p>Growing need for efficient handling solutions</p>	<p>Need to develop smart packaging solutions to reduce waste, enable recycling and re-use</p>
Demand for freedom of choice (delivery)	<p>Requires broad-based integration of systems and communication (digitalisation) to allow safe and controllable access to private properties (door, car, fridge, etc.)</p> <p>Selection of delivery address (work, car boot ...), means of transport, delivery time, etc.</p>	<p>Demands on responsive, short-term, agile transportation solutions, which may worsen fill rates and intensify traffic load</p> <p>May also increase traffic heterogeneity</p>			<p>Demands on responsive, short-term, agile transportation solutions</p>			<p>Packaging must suit all possible means of transports and thus underscores the need for packaging solutions for reliable and efficient logistics</p>
No own car and demands for carry-free shopping	<p>This trend represents a growing share of e-commerce – specifically home deliveries</p> <p>Replaces delivery to collection point and “carry-own” shopping</p> <p>Emphasises need for adaptations to private properties</p>	<p>Underscores need for cost- and environmentally efficient transport solutions</p>	<p>Accentuates pick-up points' proximity to delivery address</p> <p>May reduce share (though not total volume) of e-com deliveries through collection points and increase share of home deliveries</p> <p>The combination of shorter lead times, picking and deliveries of fresh groceries, and responsive delivery services may develop the collection point into an all-in-one function (parcel sortation and urban warehouse order-picking plus collection services and last mile deliveries)</p>	<p>Goes hand-in-hand with unwillingness to carry purchases home</p> <p>Will accentuate development of showroom boutiques and developed home delivery services</p>	<p>The combination of shorter lead times, picking and deliveries of fresh groceries, and responsive delivery services may develop the collection point into an all-in-one function (parcel sortation and urban warehouse order-picking plus collection services and last mile deliveries)</p>			<p>Is driving e-com growth and further underscores the need for packaging solutions for reliable and efficient logistics (volume efficiency and robustness in handling) and for smart solutions to reduce waste, enable recycling and re-use</p>
Environmental awareness (or regulations)	<p>A person's environmental awareness may help to change or reduce behaviours (e.g. trends listed herein) that have a negative environmental impact</p> <p>But this is dependent on providing consumers with transparent, unbiased and comprehensive information on this topic</p> <p>People's awareness of environmental impact of their own behaviour and habits (also includes public authorities' regulations for reducing environmental impact)</p>	<p>Consumers can exercise “freedom of choice” and demand particular means of transport when placing their orders – forcing transport in a specific direction</p> <p>Authorities' city traffic regulations can force operators towards other means of transport – e.g. electric vehicles, bicycles</p>		<p><i>Speculation:</i> if society fails to establish efficient last mile distribution, environmental awareness and authorities' regulation may put a brake on e-commerce growth – leaving the retail point as a relevant sales and delivery channel</p>	<p>Consumers' environmental awareness is mainly reflected in visible logistics (e.g. transports)</p> <p>Some means of transport, e.g. bicycle distribution, requires the urban sortation terminal's proximity to delivery address</p>	<p>Consumers can exercise “freedom of choice” and demand a specific means of transport when placing their orders – forcing transport in a specific direction</p>		<p>The consumer's perception of the packaging's “environmental friendliness” may overcome the “luxury” aspect that is very much in focus today</p> <p>This further underscores the need for packaging solutions for reliable and efficient logistics (volume efficiency and robustness in handling) and for smart solutions to reduce waste, enable recycling and re-use</p>