

Consumer preferences towards *on-line* and *off-line* grocery shopping channels in Norway

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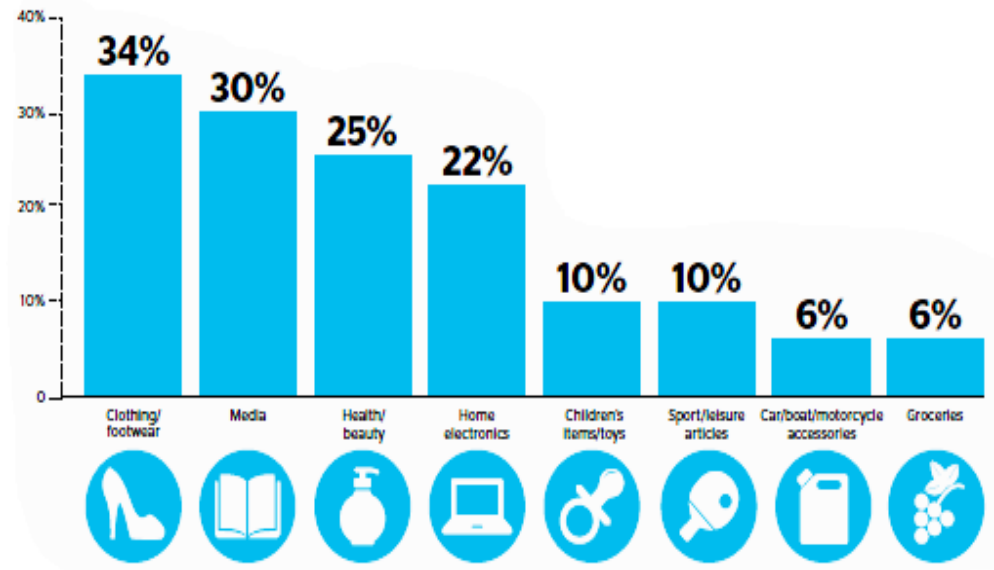
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ToC

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1. Introduction, background and motivation

- E-commerce in 2017 reached US\$2.3 trillion (1.66 billion e-shoppers) with wide regional differences
- Norway ranks second among Nordic countries
- 65% of Norwegian aged 18÷19 buy goods online
- E-grocery in 2016 was 5% of total e-commerce
- E-grocery is expected to grow in the future in Norway and inquiring future market share is relevant



1. Introduction, background and motivation

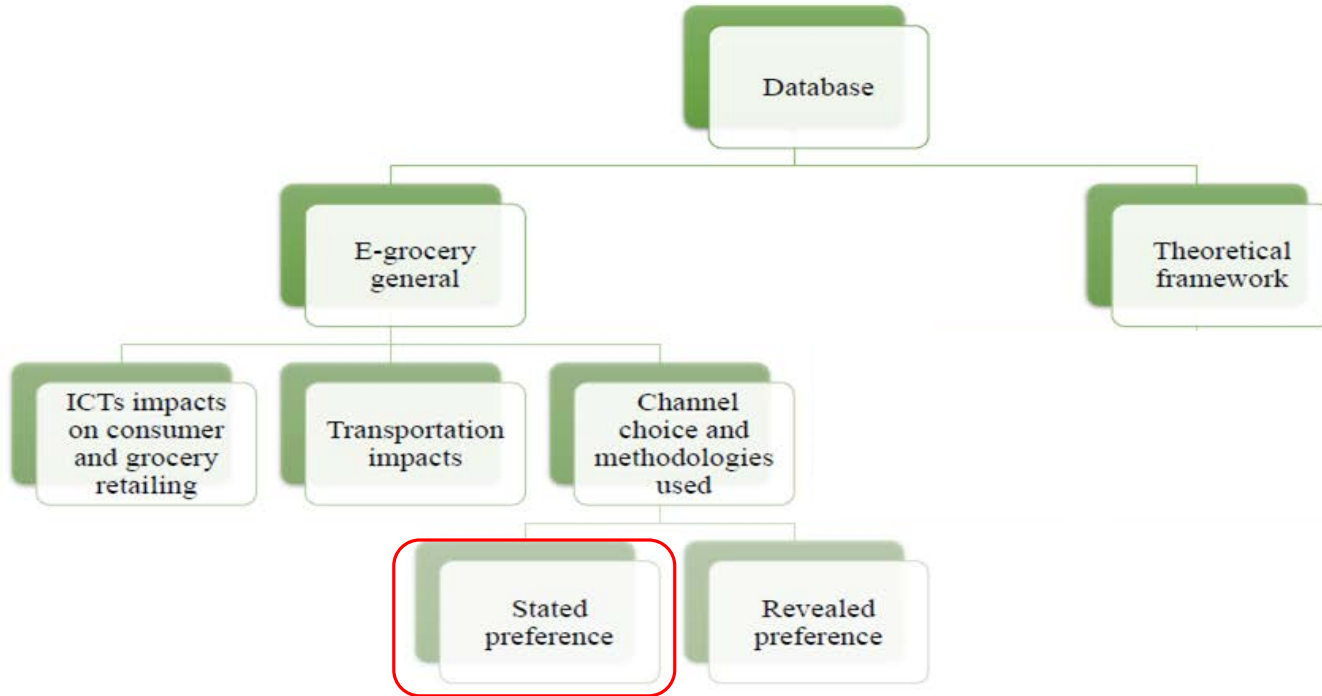
Research problem: Investigating Norwegian consumers' potential demand for E-grocery shopping, and subsequently the implications on transportation

Research question 1: *What are the factors affecting consumer preferences towards online and offline grocery shopping channels and how they influence consumers choices?*

Research question 2: *How the E-grocery market share might change in Norway?*

Research question 3: *What are the implications for the potential demand of E-grocery?*

2. Literature review

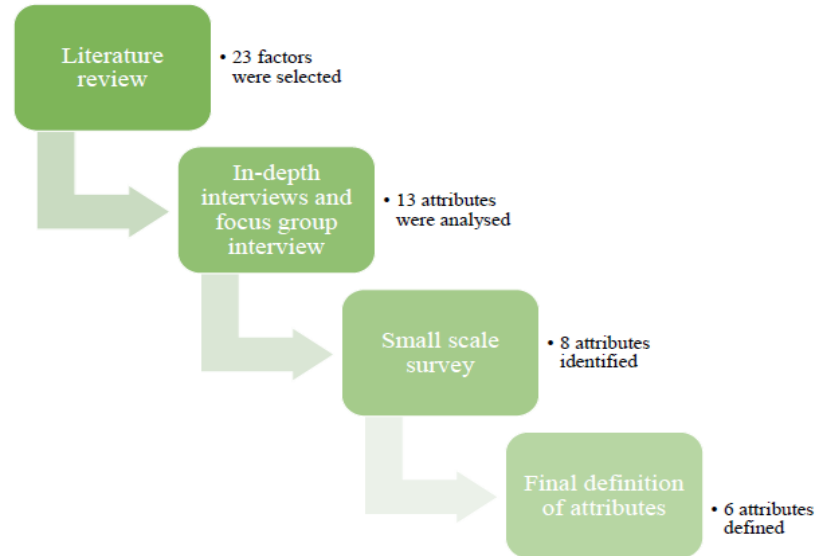


3. Methodology

- E-grocery is still an emerging industry in Norway and observations are few → This paper uses stated preference methods
- Data are acquired via: literature review, in-depth interview, focus groups, questionnaire definition, development, piloting an administration
- Agents' channel choice probabilities are estimated using discrete choice models (202 respondents/ 1208 choice tasks)

4. Questionnaire and data description

Choice tasks - Attributes identification



4. Questionnaire and data description

Attributes
level
identification

Alternatives	Attributes	Levels
In-store	Product price (PP)	Stated
	Travel time (TT)	Stated
	Product range (PR)	100%
Home delivery	Product price (PP)	Pivoted: 90%, stated (100%), 110%
	Service cost (SC_HD)	0, 60, 100 Nok
	Time window (TW)	30 min, 60 min, 120 min
	Product range (PR)	50%, 150%, 100%
	Lead time (LT)	1 hour, 6 hours, 12 hours
Click and pick	Product price (PR)	Pivoted: 90%, stated (100%), 110%
	Travel time (TT)	Pivoted: 50%, 75%, stated (100%)
	Service cost (SC_CP)	0, 50
	Product range (PR)	50%, 150%, 100%
	Lead time (LT)	1 hour, 6 hours, 12 hours

5. Econometric results

Utility specification

$$V_{\text{store}} = \beta_{0\text{store}} + \beta_{1\text{store}} \text{PP}_{\text{store}} + \beta_{2\text{store}} \text{TT}_{\text{store}} + \beta_{3\text{store}} \text{PR}_{\text{store}}$$

$$V_{\text{home delivery}} = \beta_{0\text{hd}} + \beta_{1\text{hd}} \text{PP}_{\text{hd}} + \beta_{2\text{hd}} \text{SC_HD} + \beta_{3\text{hd}} \text{TW}_{\text{hd}} + \beta_{4\text{hd}} \text{PR}_{\text{hd}} + \beta_{5\text{hd}} \text{LT}_{\text{hd}}$$

$$V_{\text{click\&pick}} = \beta_{0\text{cp}} + \beta_{1\text{cp}} \text{PP}_{\text{cp}} + \beta_{2\text{cp}} \text{TT}_{\text{cp}} + \beta_{3\text{cp}} \text{SC_CP} + \beta_{4\text{cp}} \text{PR}_{\text{cp}} + \beta_{5\text{hd}} \text{LT}_{\text{cp}}$$

5. Econometric results

MNL results - overall
Sign: Coefficients are in line with expectation
Significance: Only the ASC_SM coefficient is not significant

	Coefficient	Std Err	Z	Prob. Z	95% conf int	
Purchase Price	-.00920***	.00141	-6.54	.0000	-.01196	-.00645
Service Charge_Home Delivery	-.01809***	.00224	-8.09	.0000	-.02248	-.01371
Time Window	-.00437*	.00250	-1.75	.0800	-.00926	.00052
Product Range	.00670***	.00163	4.11	.0000	.00351	.00990
Lead Time	-.07266***	.01481	-4.91	.0000	-.10168	-.04364
ASC_Click&Pick	-.77234***	.20751	-3.72	.0002	-1.17905	-.36563
Travel Time	-.02967***	.00487	-6.09	.0000	-.03921	-.02012
Service Charge_Clik&Pick	-.01738***	.00342	-5.08	.0000	-.02408	-.01068
ASC_SuperMarket	-.15848	.20125	-.79	.4310	-.55291	.23596
	***, **, * => significance at 1%, 5%, 10% level				Pseudo R2 = 0,28	

5. Econometric results

- Consumers' WTP is positive for: *wider* product range, *shorter* travel time, time window or lead time
- 1 minute TT equals 3.225 NOK product price, and 1.707 NOK service cost for CP choice. Agents prefer to pay higher product price than service cost to save travel time
- 1 LT hour = 4 NOK (with respect to SC_HD)

WTP Measures

WTP [LT(Min)/PP(NOK)]	-0,132NOK/Min
WTP [PR(%) /PP(NOK)]	0,728NOK/+1 %
WTP [TT(Min)/PP(NOK)]	-3,225NOK/Min
WTP [TW(Min)/PP(NOK)]	-0,475NOK/Min
WTP [LT(Min)/SC_HD(NOK)]	-0,067NOK/Min
WTP [PR(%) /SC_HD(NOK)]	-0,370NOK/+1 %
WTP [TW(Min)/SC_HD(NOK)]	-0,242NOK/Min
WTP [LT(Min)/SC_CP(NOK)]	-0,070NOK/Min
WTP [PR(%) /SC_CP(NOK)]	0,386NOK/+1 %
WTP [TT(Min)/SC_CP(NOK)]	-1,707NOK/Min

5. Econometric results

Subgroups comparisons (naive heterogeneity)

- Agents with previous E-grocery experiences prefer HD while PR is less important
- Those without E-grocery experiences have no clear preferences between HD and SM
- Agents that have already purchased grocery online prefer to pay higher product price for saving travel time than those who have not such experience
- Agents who usually perform dedicated trip prefer HD
- Older people are willing to pay more service cost to save travel time than younger ones
- Males prefer HD, whereas females prefer SM
- Agents with usually more than 3 shopping bags prefer HD

6. Market simulations, policy and managerial implications

Current market share

	IN STORE			HOME DELIVERY				CLICK AND PICK				P(i)				
	PP	TT	PR	PP	SC_HD	TW	PR	LT	PP	SC_CP	TT	PR	LT	STORE	HD	CP
	(NOK)	(MIN)	(%)	(NOK)	(NOK)	(MIN)	(%)	(HOUR)	(NOK)	(NOK)	(MIN)	(%)	(HOUR)			
Large basket	1000	20	100	1000	59	120	100	12	1000	0	20	100	12	71,1 %	12,8 %	16,1 %
Small basket	500	20	100	500	89	120	100	12	500	49	20	100	12	83,2 %	8,7 %	8,0 %
Scheduled delivery	1000	20	100	1000	39	120	90	12	970	0	10	90	12	61,8 %	15,0 %	23,2 %
Express delivery	1000	20	100	1000	299	30	90	1	970	0	10	90	12	72,3 %	0,5 %	27,1 %

Scenario 1: From separated prices to free service cost

Scenario 2: Lead time is reduced from 12 hours to 6 hours.

Scenario 3: Reducing the time window from 2 hours to 1 hour.

Scenario 4: Increasing product range by 20%

Scenario 5: Reducing travel time by 50%

6. Market simulations, policy and managerial implications

Scenario Simulations

	IN STORE			HOME DELIVERY				CLICK AND PICK				P(i)				
	PP	TT	PR	PP	SC_HD	TW	PR	LT	PP	SC_CP	TT	PR	LT	STORE	HD	CP
	(NOK)	(MIN)	(%)	(NOK)	(NOK)	(MIN)	(%)	(HOUR)	(NOK)	(NOK)	(MIN)	(%)	(HOUR)			
Base	500	20	100	500	89	120	100	12	500	49	20	100	12	83,2 %	8,7 %	8,0 %
Scenario 1	500	20	100	589	0	120	100	12	549	0	20	100	12	72,7 %	16,8 %	10,5 %
Scenario 2	500	20	100	500	89	120	100	6	500	49	20	100	6	76,2 %	12,4 %	11,4 %
Scenario 3	500	20	100	500	89	60	100	12	500	49	20	100	12	81,1 %	11,1 %	7,8 %
Scenario 4	500	20	100	500	89	120	120	12	500	49	20	120	12	81,3 %	9,8 %	9,0 %
Scenario 5	500	20	100	500	89	120	100	12	500	49	10	100	12	81,0 %	8,5 %	10,5 %

Scenario 1: From separated prices to free service cost

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6. Market simulations, policy and managerial implications

Managerial implications

- Since respondents are more sensitive towards Service Cost than Purchase Cost → «Free service cost» will increase E-grocery market share
- Differentiated fee can stimulate customers choice for larger baskets and non-peak transportation hours → A dynamic pricing strategy can probably be introduced with financial success
- Marketing strategy towards different socio demographic groups seems plausible → females' WTP to save travel times is greater than men's

Policy implications

- Information technologies and innovative transport vehicles (e.g. autonomous vehicles) will play an important role
- A well developed network of proximity stations and pickup points are relevant for E-groceries
- Cooperation on last mile delivery among operators should be explored further

7. Conclusions

Contributions

- The study provides a detailed database of 202 households' grocery shopping choices
- ...Estimates utility functions for three grocery shopping alternatives: in store, home delivery, and click and pick
- ...Draws managerial/policy implications on the base of given experiment results

Limitations

- Consumers' channel choice could be influenced by other factors this study did not consider
- This study hypothesizes consumers decision making process is stable over time while one should test this

Future research

- Further research could focus on developing a framework for detecting interactions in last-mile E-groceries delivery (e.g. ABM)
- Develop comparable studies in different countries (Italy and China under way!).
- Estimate more sophisticated models (e.g. heterogeneity, non -linearity) and investigate dynamic consumer channel choice
- Estimate environmental impact of E-grocery channel choice

Thanks for listening!

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