Impact of Customer Reviews and Ratings On Online Purchasing Decisions And Conversion

Nazar H.Phulpoto¹, Sajid H. Mirani¹, Farhan A. Soomro¹, Mansoor A. Soomro², M. Younis Metlo¹, Umair Khalid³, Zuhaibuddin⁴

¹Department of Public Administration, SALU Khairpur, Pakistan

- ²Department of Business Administration, Sindh University
- ³School of Accountancy and Finance, University of Lahore
- ⁴Department of Computer system, BUET Khuzdar, Pakistan

Abstract

Now days, understanding how people make purchasing decisions in digital era are of growing importance for researchers and marketers. Customer's reviews and ratings are important for better understanding of customers and improving services. Whereas, Consumer's reviews and ratings are available online for wide range of products and services. This Study investigated how average consumer ratings, product attributes, and consumer reviews influenced on the online purchasing decisions of buyers. In line with previous research, study found that buyers use all types of information on online purchasing; they clearly preferred products with better attributes and with higher average consumer ratings. It has been found that the buyer preferences can be changed for the higher-rated products, if the product is overridden by a rich negative or positive review.

Key words:

Online purchase decisions, customer reviews, ratings and conversion.

1. Introduction

Online consumer's reviews are peer generated evaluations and posted on relevant company's website or on any other website. Customer's reviews are playing the role of star rating and open ended comments from end users. Many online retailers have already enabled their consumers to submit reviews for their products and services[25]. Due to increase in competition, customer faces difficulty in finding the best product or services. In order to try the new brand, customers have to pass through different step that strengthen his/her decision. So he/she use various techniques or ways to get to the final decision. Information from other consumers i.e. Word of mouth is considered to be more persuasive because it is written or spoken by other customers rather than brands itself and is therefore sensed as being more trustworthy and credible before taking any decision. Similarly, the emerging use of internet and smartphones has connected the people, customers in a drastic way. You can get suggestion or feedback reviews by just searching on Google or social media.

Advancement in technology and Internet speed has changed the world into global village. Where a consumer has the very easy access to the information. According to Pakistan Telecommunication Authority (PTA) 3G and 4G users ranking in Pakistan, the number of 3G and 4G subscribers in Pakistan was 56.08 million on June 2018." Whereas, the number of mobile users in Pakistan has touched 150.23 million on June 2018 observed by PTA. About 59 million people in Pakistan are smartphones user, out of which 83 percent have android devices. Fall in smartphone prices and mobile internet data is directly related to number of smartphone users. Google reaches almost 80% of the internet users worldwide. With ref to recent Facebook audience insights, Pakistan insights: 200M - 250M monthly active people.

In Pakistan, where the launch of 4G technology has enhanced the communication but also have changed the way of businesses and customer buying pattern. The younger consumers are dominating E-commerce at averaged, but due to trust issues and less physical interaction, buyer faces a lot of difficulty in making purchase decisions. It has become important to understand, how buyers make on-line purchasing decisions? What information do they consider if price factor is not so much sensitive? Including the use of this research for decision making and obviously the product sale? For this purpose, two products have been presented simultaneously and sequentially to know, whether the decision varies or not. Study will also clear the emerging trend of online reviews in Pakistan and how it affects customer purchasing behavior and probability.

This research first presents relevant literature of reviews and ratings of consumer's influence on their purchase decision; and secondly on how advancement in technology and communication system is influencing decision making processes. Latter research discusses empirical studies investigating how buyer use various factor i.e. reviews, rating, products attribute in online purchasing. At the end, research results and findings are discussed for develop such a e-commerce systems which

is really helpful for E-commerce industry in general and specific to Pakistan.

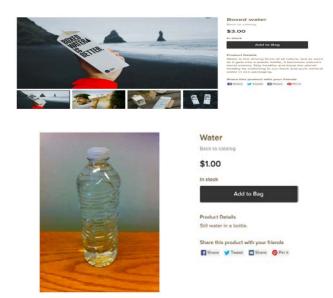
2. Literature Review

Consumer reviews influence the on attitudes and purchasing intentions of consumers:

The Effects the customer's negative and positive reviews and ratings on online decisions are mostly recognized and acknowledged phenomena. Many researches have stated that ratings and reviews of the consumers have impact on buying intensions and the behavior, Consumers reviews and ratings also develop attitudes positive towards the products and retailers. The most important characteristics influencing sales and attitudes of consumers are the experience of the buyer with the product, According to recent studies [5,7]. Generally speaking, higher number of positive reviews increases chances of conversion for particular product. Whereas, the higher number of negative reviews reduces the chances of conversion [5, 8]. Reviews effect; however this also depends on the source of the review and the review exposure [9]. The reviewer characteristics also effect, which means a tech person sharing a review about the technical product has more influence on user rather than news expert [10.5]. The both the positive reviews and the negative reviews can influence consumer's behavior. Some researchers have mentioned that positive and negative reviews differ in their strength of influence. The negative reviews had the strongest effect on buyer's attitudes and usefulness as compare to positive reviews stated by Purnawirawan et al [7]. The negative reviews of users may carry more weight as compare to positive reviews, it is narrated [11,12]. This is also finding in the area of communication [13,14]. Some studies reveal that consumer's negativity bias is limited to hedonic good [12]. The consumers may not give too much importance to negative reviews but they also receive and consider such views as more informative reviews, stated by Wu[15]. Beside this, along the reviews the format of information also matter for consumers. Mostly online formats provide reviews into two formats; first are overall reviews with perceived quality, and the second are individual reviews that include only personal narratives. There is how much importance of the both types of information is still an ongoing process and a debate. Consumers give value to the average ratings also as important, according to current researches [16]. The narrative and statistical information are equally convincing and important, according to Hong and Park [17]. Average ratings have its importance but a single review could conquer average ratings, stated by Weber and Ziegel[18]. It has been found that ratings and reviews are also considered to be important in Health sector, while making choices [19-21]. General discussion related to how

much single reviews influence the consumer behavior is also important because sometimes consumers read only a small number of reviews before making actual purchase decision. During this process consumers may be are considering only most recent reviews as important [16]. In the end it can be assumed that, consumer's decisions are more influenced by average consumer ratings. The ratings of a product will lose influence on actual decisions if there are no well written reviews [18]. Further, few studies have found that negative reviews are more impact than the positive reviews [7] so it clear that single positive review has less value than a negative single review. It is also saving that business need more negative reviews are compare to positive reviews for improvements. Although, Business are striving for getting five star reviews as much as possible. It is also a fact before purchasing we are checking reviews and if there are negative reviews we don't purchase and if there are positive reviews mostly we will purchase. This should not be your goal if you wish to improve your business. You may not believe but earning positive reviews may not critical for your business. Negative reviews can help your business in many ways. So do not put your all efforts in avoiding negative reviews, if you do then you are going wrong. You may find this all as hard but it is fact, which you must not ignore.

Option Presentation: During decision process product cards are mostly shown side by side and simultaneously. Consumers during purchasing online products consider points sequentially. The decision task is the same as simultaneous or sequential presentations can be, after the decision process. Presenting sequentially can result in higher order effects and can make positive way for the first option [55]. The simultaneous presented options make more satisfied to the peoples [56]. The decision processes may change depending on the presentation with the simultaneous presentation and facilitating attribute-wise comparisons may cause change in decision process. Mentioning a single option usually leads to more alternative-wise comparisons of products or services [57]. The positive purchase experience can make the difference in making choice to buy from your and from your rivals. The presentation of products can make the big difference. For example take these folioing products. Here first product is cheap and you also can see it is water, but is not only thing that is appealing. The second is expensive and you cannot clearly see it is water. But what is important that it is trendy and engaging. These both are functionally identical products but one is more attractive than others. This attraction is the real presentation. Human desires more orders and online shopping is not different. Customers need patters and logic in presentations [26]



Presenting the type and price is not focus of this research, but it is not clear whether products were presented sequentially or simultaneously to ensure the effects of average ratings and reviews.



The above picture shows an exemplary product's card. It is showing a choice between two irons in the positive review condition. In this figure the rich and positive reviews are shown for the lower rated product on the left. The short baseline reviews are for higher rated product on the right side.

Further it is also important to note here, for many products and services online reviews are available. These reviews are playing the role of supplementary information beside other information given for online products available. Many researchers have already demonstrated that presence of reviews is beneficial for products and online stores or sellers as well for buyers. During the product search process these reviews are playing important role in making decision about a particular product and add value to prospective customers. Previous researches have extremely evaluated and examined these experts' reviews and online recommendations [25]. Online retailers are considering online reviews as primary source measuring the consumer's evaluations. Customers are also evaluating reviews according to their level of helpfulness; but past research has not provided a helpful theoretical ground. Helpfulness can be measured as perceived value n a decision making process of any product.

3. Methods

During this research respondents were presented with pairs of household products i.e. the pair of Vacuum Cleaner, Drill machine & Hand free. Consumers had to choose one out of the two options they would prefer to buy from given options. Pairs of Products were presented on cards and described by four relevant attributes, price, rating and reviews. In addition to the products' attributes, an average consumer rating was shown for each product with varied reviews. All average ratings were positive but one product was always rated somewhat better than the other product. A better rated product with low price and low rated product in comparison with rich review were shown to the participants' tested three product cards on buyer. In the "no single review condition", participants only received information about average consumer ratings and in comparison the product have high price but rich review. This condition allowed us to test whether participants relied on average consumer rating in their choices. The scale adopted was previously conducted by the Polish Japanese Academy of Information Technology (PJAIT). They were approved by the Ethics Committee of the Department of Psychology at the University of Basel.

4. Data Analysis

	Which drill machine will you purchase?	N	Mean	Std. Deviation	Std. Error Mean
[How much the product	Blue - Positive rich review	25	5.56	1.446	.289
attributes/features are important to you]	Red Drill - No review but low cost	13	5.23	1.536	.426

	Which Hands Free will you purchase?	N	Mean	Std. Deviation	Std. Error Mean
[How much the product attributes/features are	Red - Low rating but detailed review		5.42	1.501	.294
important to you]	Black with high rating single line review		5.50	1.446	.417

	Which Iron will you purchase?	NN	Mean	Std. Deviation	Std. Error Mean
[How much the product attributes/features are important to you]	First one - Detailed review with low rating	21	5.43	1.502	.328
	Second one - single line review with high rating	17	5.47	1.463	.355

Which drill machine will you purchase=1 and
Which Hands Free will you purchase=1 and
Which Iron will you purchase=2 (FILTER)
Frequency Percent Valid Percent Cumulative Percent
ValidSelected 2 100.0 100.0 100.0

For Reviews

Which drill machine will you purchase=1 Which Hands Free will you purchase=1 Which Iron will you purchase=2 (FILTER)

	requency	'	Valid Percent	Cumulative Percent
ValidSelected	2	100.0	100.0	100.0

For Ratings

Which drill machine will you purchase A=2
Which Iron will you purchase A=2
How much the product attributes features are important to you=2
(FILTER)

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Selected	1	100.0	100.0	100.0

Its shows that both ratings and review affect the online consumer purchasing decision making.

Which Hands Free will you purchase=1
Which Iron will you purchase=1 (FILTER)
Frequency Percent Valid Percent Cumulative Percent
ValidSelected 20 100.0 100.0 100.0

Which Hands Free will you purchase=1
Which drill machine will you purchase=1 (FILTER)
Frequency Percent Valid Percent Cumulative Percent
ValidSelected 21 100.0 100.0 100.0

It shows that if we see the two out of three product cards than almost 20-21 people out of 38value the review to make their decision making while 10-11 people value the ratings.

Desc	riptive S	tatistics			
NM	linimum	Maximum	Mean S	Std. Deviation	1
38	.00	.00	.0000	.00000	

Review	38	.00	.00	.0000	.00000
Product Attribute	38	2	7	5.45	1.465
Ratings importance	: 38	2	7	4.74	1.703
Review imp in decision	on38	1	7	5.42	1.703

Reviews usefulness	38	1	7	5.42	1.840
Decision Diff	38	2	5	3.71	.802
Prod knw	38	1	5	2.68	1.165
Valid N (list wise)	38				

		Revie w	Product Attribute	relatio Ratin gs imp		Reviews usefulnes s	Decisio n Diff	Prod knw
	Pears on Corre	.a	.a	.a	.a	.a	.a	.a
Review	Sig. (2-tailed)							
	N	38	38	38	38	38	38	38
Product	Pears on Corre	.a	1	.503*	.183	.189	025	.038
Attribute				.001	.273	.256	.882	.823
	N	38	38	38	38	38	38	.38
Ratings	Pears on Corr:	.a	.503**	1	222	205	295	.366*
importar ce			.001		.181	.217	.073	.024
	N	38	38	38	38	38	38	38
Review	Pears on Corr:	.a	.183	222	1	.813**	.468**	.490* *
imp in decision	Sig.		.273	.181		.000	.003	.002
	N	38	38	38	38	38	38	38
Reviews		.a	.189	205	.813*	1	.451**	.352*
usefulne ss	Sig. (2- tailed)		.256	.217	.000		.004	.030
	N	38	38	38	38	38	38	38
Decision	Pears on Corre	.a	025	295	.468*	.451**	1	216
Diff	Sig. (2- tailed)		.882	.073	.003	.004		.192
	N	38	38	38	38	38	38	38
Duo d	Pears on Corre	.a	.038	.366*	- .490* *	352*	216	1
Prod knw	Sig. (2-tailed)		.823	.024	.002	.030	.192	
	N	38	38	38	38	38	38	38

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

a. Cannot be computed because at least one of the variables is constant.

Model Summary									
				Std.	(Change S	tati	stics	
Model	R	Squar		of the	R Square Change		df 1	df2	Sig. F Chan ge
1	.716a	.512	.418	.387	.512	5.427	66	31	.001
D 1	1	(0)	() D	1.1	D 1 /	A '1 .	ъ		D. CC

a. Predictors: (Constant), Prod knw, Product Attribute, Decision Diff, Reviews usefulness, Ratings importance, Review imp in decision

		ANG	AVC	a		
	Model	Sum of Squares	df	Mean Square	F	Sig.
	Regression	4.867	6	.811	5.427	.001b
1	Residual	4.633	31	.149		
	Total	9.500	37			

Dependent Variable: Which Hands Free will you purchase=1, Which drill machine will you purchase=1, Which Iron will you purchase=1 (FILTER)

b. Predictors: (Constant), Prod knw, Product Attribute, Decision Diff, Reviews usefulness, Ratings importance, Review imp in decision

		Coefficient	s ^a		
Model	Unstandardized Coefficients B Std. Error		Standardized Coefficients Beta	t	Sig.
(Constant)	.273	.475	2011	.575	.569
Product Attribute	.035	.054	.101	.647	.522
Ratings importance	146	.049	490	-2.947	.006
1 Review imp in decision	008	.071	026	109	.914
Reviews usefulness	.094	.061	.343	1.557	.130
Decision Diff	.086	.093	.136	.925	.362
Prod knw	023	.066	053	349	.729

a. Dependent Variable: Which Hands Free will you purchase=1 and Which drill machine will you purchase=1 and Which Iron will youpurchase=1 (FILTER)

Reliability

Scale: ALL VARIABLES

Case Processing Summary			
		N	%
Cases	Valid	38	100.0
	Excludeda	0	.0
	Total	38	100.0
a. Listwise deletion based on all variables in the procedure.			

Reliability Statistics

Cronbach's Alpha N of Items
.380 7

5. Discussion

It was found that buyers give more importance to both the ratings and reviews. The buying behavior is also affected by attributes of products even reviews of the product may be negative or positive. Influence of product attributes: For users, the quality index of product's attributes is strongly influenced choice in both cases; when no reviews were presented and also even when the single review was Influence of average consumer ratings with detailed review: Users were strongly influenced by aggregated consumer ratings with detailed review. Two products were shown to the buyers and both were having the reviews. But users preferred the product with detailed rich review. Influence of sequential simultaneously: The products were shown simultaneously and sequentially to the buyers and it was found that decision has not been affected by simultaneously and sequentially reviews but respondents selected product with reviews as the purchasing option.

Limitations

There is no any effect of gender on choices only in some cases it partly influenced product knowledge. It suggests that the results are not influenced on the basis of gender. Further, as in Pakistan the ecommerce industry is in growing phase so, there are the chances that buyer behaviors in future shift to one particular rating or reviews.

Theoretical and Practical Implications

This support of product rating and reviews on purchase will help the E-commerce businesses to understand the importance of ratings and reviews on the conversions. It will also help the future researcher to carry out the research in future to analyze the shift in trend with the growth in Ecommerce sector in Pakistan.

6. Conclusions

This study has provided theoretical and empirical understanding of online reviews and ratings. Results shows that both ratings and reviews have strong impact on the buyer's online purchase decision, and it has also been found that details rich review has more positive affect as compared to single line or two words review. So the Ecommerce industry in Pakistan should focus on both rating and review to convert the website visitor in to conversion/purchase. In initial phase of getting information customer is more concerned about the ratings, and in latter phases he/she is more interested in purchase than she/he goes for the reviews and ratings. This study contributes in theory as well in practices as it is helpful in providing theoretical framework for better understanding the online reviews and ratings for online purchase decisions and conversions.

References

- [1] J.W. Lian, D.C. Yen, Online shopping drivers and barriers for older adults: age and gender differences, Computers in Human Behavior 37 (2014) 133–143.
- [2] M.Law,M.Ng,Ageandgenderdifferences:understandingmatu reonlineuserswith the online purchase intention model, Journal of Global Scholars of Marketing Science 26 (3) (2016) 248–269.
- [3] Y.J. Ma, H. Kim, H.-h. Lee, Effect of individual differences on online review perception and usage behavior: the need for cognitive closure and demographics, Journal of the Korean Society of Clothing and Textiles 36 (12) (2012) 1270–1284.
- [4] P.Y. Chen, S.y. Wu, J. Yoon, The impact of online recommendations and consumer feedback on sales, ICIS 2004 Proceedings, 2004, p. 58.
- [5] K. Floyd, R. Freling, S. Alhoqail, H.Y. Cho, T. Freling, How online product reviews affect retail sales: a meta-analysis, Journal of Retailing 90 (2) (2014) 217–232, https://doi.org/10.1016/j.jretai.2014.04.004.

- [6] R.A. King, P. Racherla, V.D. Bush, What we know and don't know about online word-of-mouth: a review and synthesis of the literature, Journal of Interactive Marketing 28 (3) (2014) 167–183.
- [7] Y. Liu, Word of mouth for movies: its dynamics and impact on box office revenue, Journal of Marketing 70 (3) (2006) 74–89.
- [8] E. Maslowska, E.C. Malthouse, V. Viswanathan, Do customer reviews drive purchase decisions? The moderating roles of review exposure and price, Decision Support Systems 98 (2017) 1–9.
- [9] S. Karimi, F. Wang, Online review helpfulness: impact of reviewer profile image, Decision Support Systems 96 (2017) 39–48.
- [10] J. Lee, D.h. Park, I. Han, The effect of negative online consumer reviews on product attitude: an information processing view, Electronic Commerce Research and Applications 7 (2008) 341–352.
- [11] S. Sen, D. Lerman, Why are you telling me this? An examination into negative consumer reviews on the web, Journal of Interactive Marketing 21 (4) (2007) 76–94.
- [12] C. Betsch, N. Haase, F. Renkewitz, P. Schmid, The narrative bias revisited: what drives the biasing influence of narrative information on risk perceptions? Judgment and Decision Making 10 (3) (2015) 241–264.
- [13] P. Rozin, E.B. Royzman, Negativity bias, negativity dominance, and contagion, Personality and Social Psychology Review 5 (4) (2001) 296–320.
- [14] P.F. Wu, In search of negativity bias: an empirical study of perceived helpfulness of online reviews, Psychology & Marketing 30 (11) (2013) 971–984.
- [15] BrightLocal, LocalConsumerReviewSurvey2016, (2016) http s://www.brightlocal. com/learn/local-consumer-reviewsurvey/.
- [16] S. Hong, H.S. Park, Computer-mediated persuasion in online reviews: statistical versus narrative evidence, Computers in Human Behavior 28 (3) (2012) 906–919.
- [17] M. Ziegele, M. Weber, Example, please! Comparing the effects of single customer reviews and aggregate review scores on online shoppers' product evaluations, Journal of Consumer Behaviour 14 (2015) 103–114.
- [18] C. Betsch, C. Ulshöfer, F. Renkewitz, T. Betsch, The influence of narrative v. statistical information onperceivingvaccinationrisks, Medical DecisionMaking31(5) (2011) 742–753, https://doi.org/10.1177/0272989X11400419.
- [19] P.A. Ubel, C. Jepson, J. Baron, Theinclusion of patient testimonials indecision aids, Medical Decision Making 21 (1) (2001) 60–68.
 - A. Winterbottom, H.L. Bekker, M. Conner, A. Mooney, Does narrative information bias individual's decision making? A systematic review, Social Science andMedicine 67 (12) (2008) 2079–2088.
- [20] P.B. Baltes, U.M. Staudinger, U. Lindenberger, Lifespan psychology: theory and application to intellectual functioning. Annual Review of Psychology 50 (1999) 471– 507, https://doi.org/10.1146/annurev.psych.50.1.471.
- [21] L.L. Carstensen, The influence of a sense of time on human development, Science 312 (5782) (2006) 1913–1915.

- [22] Chen, Y., and Xie, J. 2005. "Third-Party Product Review and Firm Marketing Strategy," Marketing Science (24:2), pp. 218-240.
- [23] https://www.builderfly.com/5-best-presentation-tips-to-make-your-products-more-attractive-to-your-customers.
- [24] R. Mata, T. Pachur, B. von Helversen, R. Hertwig, J. Rieskamp, L. Schooler, Ecological rationality: aframework for understanding and aiding the aging decision maker, Frontiers in Decision Neuroscience 6 (Article 19) (2012) 1–6, https://doi. org/10.3389/fnins.2012.00019.
- [25] W.A. Rogers, A.J. Stronge, A.D. Fisk, Technology and Aging, Reviews of human factors and ergonomics 1 (1) (2005) 130–171.
- [26] T.A.Salthouse, Mentalexer cise and mental aging: evaluating the validity of the "use it or lose it" hypothesis, Perspectives on Psychological Science 1 (1) (2006) 68–87.
- [27] T. Salthouse, Consequences of age-related cognitive declines, Annual Review of Psychology 63 (2012) 201–226.
- [28] M.L. Finucane, C.K. Mertz, P. Slovic, E.S. Schmidt, Task complexity and older adults' decision-making competence, Psychology and Aging 20 (1) (2005) 71–84.
- [29] R. Frey, R. Mata, R. Hertwig, The role of cognitive abilities in decisions from experience: age differences emerge as a function of choice set size, Cognition 142 (2015) 60–80, https://doi.org/10.1016/j.cognition.2015.05.004.
- [30] R. Mata, L. Nunes, When less is enough: cognitive aging, information search, and decision quality in consumer choice, Psychology and Aging 25 (2010) 289–298, https://doi.org/10.1037/a0017927.
- [31] R. Mata, L.J. Schooler, J. Rieskamp, The aging decision maker: cognitive aging and the adaptive selection of decision strategies, Psychology & Aging 22 (2007) 101037/0882-7974224796.
- [32] B. von Helversen, R. Mata, Losing a dime with a satisfied mind: positive affect predicts less search in sequential decision making, Psychology and Aging 27 (4) (2012) 825–839, https://doi.org/10.1037/a0027845.
- [33] G. Gigerenzer, P.M. Toddthe ABC Research Group, Simple Heuristics That Make Us Smart, Oxford University Press, 1999.
- [34] R. Mata, B. von Helversen, J. Rieskamp, Learning to choose: cognitive aging and strategy selection learning in decision making, Psychology and Aging 25 (2) (2010) 299–309, https://doi.org/10.1037/a0018923.
- [35] J.A. Mikels, C.E. Löckenhoff, S.J. Maglio, L.L. Carstensen, M.K. Goldstein, A. Garber, Following your heart or your head: focusing on emotions versus information differentially influences the decisions of younger and older adults, Journal of Experimental Psychology: Applied 16 (1) (2010) 87.
- [36] C.A. Cole, S.K. Balasubramanian, Age differences in consumers' search for information: public policy implications, Journal of Consumer Research 20 (1993) 157–169.
- [37] C.M. Schaninger, D. Sciglimpaglia, The influence of cognitive personality traits and demographics on consumer information acquisition, Journal of Consumer Research 8 (2) (1981) 208–216.
- [38] R. Lambert-Pandraud, G. Laurent, E. Lapersonne, Repeat purchasing of new automobiles by older consumers: empirical evidence and interpretations, Journal of Marketing 69 (2) (2005) 97–113.

- [39] S.M. Carpenter, C. Yoon, Aging and consumer decision making, Annals of the New York Academy of Sciences 1235 (1) (2011) 1–12.
- [40] Q. Ma, K. Chen, A.H.S. Chan, P.L. Teh, Acceptance of ICTs by older adults: a review of recent studies, International Conference on Human Aspects of IT for the Aged Population, Springer, 2015, pp. 239–249.
- [41] Ahmed, A.S. Sathish, Determinants of online shopping adoption: meta analysis and review, European Journal of Social Sciences 49 (4) (2015) 483–510.
- [42] G. Cohen, Language comprehension in old age, Cognitive Psychology 11 (4) (1979) 412–429.
- [43] R. De Beni, E. Borella, B. Carretti, Reading comprehension in aging: the role of working memory and metacomprehension, Aging, Neuropsychology, and Cognition 14 (2) (2007) 189–212, https://doi.org/10.1080/13825580500229213.
- [44] L.H. Phillips, R.D. MacLean, R. Allen, Age and the understanding of emotions neuropsychological and sociocognitive perspectives, The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences 57 (6) (2002) 526–P530.
- [45] L.L. Carstensen, Motivation for social contact across the life span: a theory of socioemotional selectivity, Nebraska symposium on motivation, vol. 40, 1993, pp. 209–254.
- [46] S.T. Charles, L.L. Carstensen, Social and emotional aging, Annual Review of Psychology 61 (2010) 383–409.
- [47] A.E. Reed, L. Chan, J.A. Mikels, Meta-analysis of the agerelated positivity effect: age differences in preferences for positive over negative information, Psychology and Aging 29 (1) (2014) 1–15.
- [48] H.H. Fung,L.L.Carstensen, Sending memorablemessagestotheold: agedifferences in preferences and memory for advertisements, Journal of Personality and Social Psychology 85 (1) (2003) 163–178.
- [49] M.K. Depping, A.M. Freund, Normal aging and decision making: the role of motivation, Human Development 54 (6) (2011) 349–367. [52]
- [50] M.J. Frank, L. Kong, Learning to avoid in older age, Psychology and Aging 23 (2) (2008) 392–398, https://doi.org/10.1037/0882-7974.23.2.392.
- [51] D. Hämmerer, S.C. Li, V. Müller, U. Lindenberger, Life span differences in electrophysiological correlates of monitoring gains and losses during probabilistic reinforcement learning, Journal of Cognitive Neuroscience 23 (3) (2011) 579–592.
- [52] B. Eppinger, N.W. Schuck, L.E. Nystrom, J.D. Cohen, Reduced striatal responses toB. von Helversen et al. Decision Support Systems 113 (2018) 1–10
- [53] reward prediction errors in older compared with younger adults, Journal of Neuroscience 33 (24) (2013) 9905–9912.
- [54] Mantonakis, P. Rodero, I. Lesschaeve, R. Hastie, Order in choice: effects of serial position on preferences, Psychological Science 20 (11) (2009) 1309–1312, https:// doi.org/10.1111/j.1467-9280.2009.02453.x.
- [55] Mogilner, B. Shiv, S.S. Iyengar, Eternal quest for the best: sequential (vs. simultaneous) option presentation undermines choice commitment, Journal of Consumer Research 39 (6) (2013) 1300–1312, https://doi.org/10.1086/668534.

- [56] Dieckmann, K. Dippold, Compensatory versus noncompensatory models for predicting consumer preferences, Judgment and Decision Making 4 (3) (2009) 200–213.
- [57] W. Kopeć, K. Skorupska, A. Jaskulska, K. Abramczuk, R. Nielek, A. Wierzbicki, LivingLab PJAIT: towards better urban participation of seniors, Proceedings of the International Conference on Web Intelligence, ACM, 2017, pp. 1085–1092.
- [58] W. Kopeć, B. Balcerzak, R. Nielek, G. Kowalik, A. Wierzbicki, F. Casati, Older adults and hackathons: a qualitative study, Empirical Software Engineering (2017) 1–36
- [59] W. Kopeć, K. Abramczuk, B. Balcerzak, M. Juźwin, K. Gniadzik, G. Kowalik, R. Nielek, A location-based game for two generations: teaching mobile technology to the elderly with the support of young volunteers, eHealth 360, Springer, 2017, pp. 84–91.
- [60] D. Godes, D. Mayzlin, Using online conversations to study word-of-mouth communication, Marketing Science 23 (4) (2004) 545–560.
- [61] P. Resnick, R. Zeckhauser, J. Swanson, K. Lockwood, The value of reputation on eBay: a controlled experiment, Experimental Economics 9 (2) (2006) 79–101.
- [62] H. Singmann, B. Bolker, J. Westfall, F.Aust, afex: Analysis of Factorial Experiments, (2016) https://CRAN.R-project.org/package=afex r package version 0.16-1.
- [63] R.V. Lenth, Least-squares means: the R package Ismeans, Journal of Statistical Software 69 (1) (2016) 1–33, https://doi.org/10.18637/jss.v069.i01.
- [64] F. Schieber, Human factors and aging: identifying and compensating for age-related deficits sensory and cognitive function, Impact of technology on successful aging, 2003, pp. 42–84.
- [65] L.H. Phillips, R. Allen, Adult aging and the perceived intensity of emotions in faces and stories, Aging Clinical and Experimental Research 16 (3) (2004) 190–199.
- [66] N. Hu, N.S. Koh, S.K. Reddy, Ratings lead you to the product, reviews help you clinch it? The mediating role of online review sentiments on product sales, Decision Support Systems 57 (2014) 42–53.