

B2C E-Commerce Adoption among Elders in Greece

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Abstract. *The use of e-commerce has a lot of potential to make the lives of older people better. It could give them power, the ability to manage and control their finances, lower care costs, and make them less reliant on others, so they could live on their own. Using a questionnaire survey, this study looks at whether individual characteristics of older Greek people could affect their adoption of e-commerce. Eight variables that could be linked to adoption: gender, age, marital status, residential status, level of education, experience with information technology, employment status, and income were examined. The results show that age, gender, residential status, education level, employment status, and income all play a big role in how older people shop online. The results of this study help service providers and the government understand how older people's individual characteristics affect online shopping. As a result, this knowledge would help them find and use the right strategies to improve online shopping.*

Keywords: E-commerce adoption, older people, Greece, individual characteristics

JEL Codes: JEL Codes: O18, O33, R2

1. Introduction

The retail sector has changed dramatically since the internet's introduction. In 2020, nearly two billion individuals have bought products or services online. In the year of the pandemic, global retail e-commerce sales grew by more than 25%, with Argentina reporting the largest percentage rise (Statista, 2021).

Consumers nowadays have access to global marketplaces with more product availability from a range of sellers through e-commerce. The Internet has created a low-cost channel for consumers to purchase goods and services, as well as lower transaction costs (Willis, 2004). E-commerce can also save money for e-businesses by better managing their supply chains (Willis, 2004; Chong et al. 2011).

According to Brynjolfsson et al. (2000), e-commerce prices are 9-16 percent lower than brick-and-mortar prices. E-commerce also boosts retail competition as well as surplus value and customers can make purchases from any location and at any time. Other benefits for the buyers are "enhanced communication features" as many communication technologies can be used and "purchase flexibility" as they believe they can utilize e-commerce services from anywhere at any time. (Anckar et. al 2003).

Economic growth is accelerated by increases in national income and the amount of output and services produced. E-commerce spending was shown to have a beneficial influence on per capita GDP (Cardona et. al, 2015; Anvari and Norouzi, 2016).

Despite the negative consequences it may have on brick-and-mortar establishments, e-commerce has a net beneficial impact on society. According to Zatonatska (2018), the development of Internet sales per capita in Ukraine and Poland helps to lower unemployment rates. It also connects people, especially with the help of social networks (Linda, 2010).

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More than 1.8 billion individuals throughout the globe currently buy their items online. According to Internet World Statistics (2020), there are over 3 billion Internet users worldwide. This development suggests that internet shopping has a lot of potential and advantages for people and companies. According to Eurostat (2020), Greece is among the countries that have one of the least internet purchases by individuals (54%), far below the Euro area average which is 68%. We can see that, except for the ages 25-34, internet purchases are continuously below Europe's average for Greek individuals (Figure 1). As age progresses the gap increases also. The biggest distance from the rest of Europe is for the ages 65 to 74.

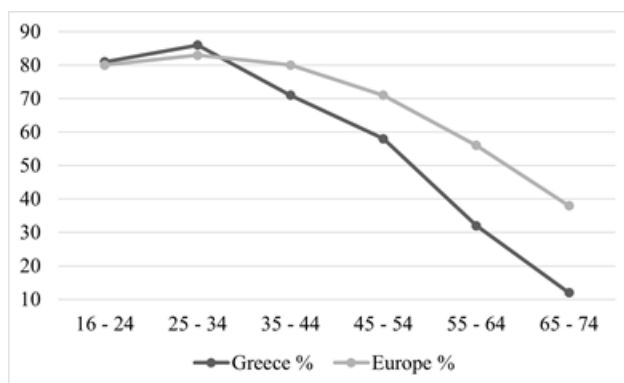


Fig. 1: Internet purchases by age group in Europe for 2021
 (Source: *research - Atanasova I. and Gerakis V. (2022)*)

Greece is one of the European nations with the highest proportion of senior citizens (Eurostat, 2020c). According to Eurostat (2021), Europe-27 has a 32% population aged 65 years or over to a population 15 to 64 years old. Greece's corresponding percentage is 35.1% for 2020, and the projection for 2050 is 52% for EU-27 and 62.6% for Greece.

2. E-commerce during the recession period

Greece's fiscal and macroeconomic climate deteriorated precipitously in 2008 and 2009. In 2010, an EU-IMF-financed economic adjustment program was launched to address imbalances. Between 2008 and 2016, Greece lost over a quarter of its GDP in constant terms. Meanwhile, there was a significant brain drain and widespread underinvestment, both of which had far-reaching economic and social effects (Stournaras 2019).

The crisis had the greatest effect on earnings (Lyberaki 2018). The median income of those aged 50+ decreased significantly across all age categories. However, the effect was far from even: those of the working age (50-64) had the greatest reduction (by 13 percent), followed by older categories (decline by 7 percent). These effects are shown in private disposable income per capita (which has decreased by 23 percent), while the age gap is also reflected in EU-SILC statistics. As Lyberaki (2018) discusses, working individuals lost on average more than retirees.

Ebbinghaus (2021) showed that the economic position of elderly adults varies significantly throughout Europe (Figure 2). Southern Europe's Bismarckian systems lessen poverty for older people in comparison to the working-age population. As shown in the graph, Greece's old population has a substantially lower risk of poverty than the majority of other countries.

Numerous studies indicate that elderly adults are quite prosperous and seem to be eager to spend. In the United Kingdom, an analysis of household spending by age finds that those aged 50 to 64 spend more per head on leisure and culture, including autos, movie and theatre tickets, and international trips than any other

age group (Sunbury and Simcock, 2009). There has been much evidence in the literature that older consumers tend to have the same buying behaviour as the youngest ones, as they are an increasingly important market for a variety of goods and services (Uncles and Lee, 2006; Sunbury and Simcock, 2009).

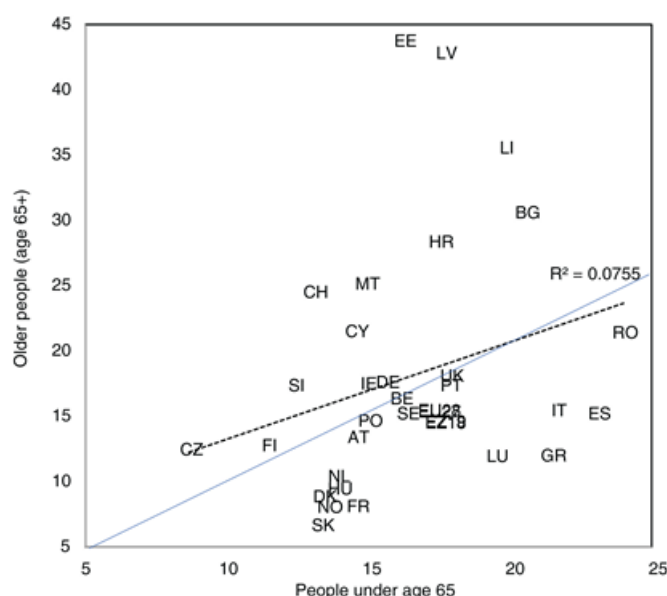


Fig. 2: At-risk-of-poverty rate by age group.

(Source: *At-risk-of-poverty rate (ilc_pnp1)* in EU-SILC (2017/18) as cited in Ebbinghaus (2021))

For more than a decade, Greece has been exposed to tremendous austerity. E-commerce has been shown to be an effective technique for minimizing the effects of a crisis in research. Many Greek seniors have yet to adopt business-to-consumer e-commerce; this study will seek to rationalize their decision and provide insights that will contribute to enhancing Greece's social welfare and economy.

3. Literature review and hypotheses development

This study is the first in Greece to provide thorough information on the uptake of Internet commerce among Greek older adults to electronic commerce stakeholders. It is vital to explore the challenges and opportunities related to Internet commerce from a scientific approach. Only then, based on a complete grasp of future consumer behavior, can business plans be designed and implemented. The goal of this study is to see whether disparities in e-commerce adoption among older Greeks can be linked to individual characteristics.

Men prefer to purchase online more than women, according to Lian and Yen (2014), because they view compatibility, complexity, and relative advantage to be more beneficial. Women prioritise satisfaction and comfort first, followed by function and quality, according to Azevedo et al. (2008), justifying the existence of gender differences in consumer buying behavior. According to Jen-Hung and Yi-Chun (2010), men are more favorable about online buying than women, citing utilitarian reasons (like convenience, absence of

social interaction, and cost savings), while females emphasize hedonistic reasons (like adventure, social interaction, fashion, and value). According to Hashim et al. (2009), men are more likely than women to shop online due to their commitment to their jobs and studies. Female shoppers are more leisure shoppers who prefer to do their shopping the old-fashioned way.

Hypothesis One: Gender is a substantial positive indicator of elderly people's e-commerce adoption.

According to Ariansyah et al. (2021), age appears to have a negative relationship with e-commerce adoption. Older people may not fully comprehend the benefits of the Internet. Furthermore, younger people prefer to shop online. According to Lee (2010), both Internet use and e-commerce adoption are affected by age. McCloskey (2006) and McCloskey and Leppel (2010) found that people over the age of 70 were less likely to have shopped online and were more negative about how easy it is to get information than younger people.

Hypothesis Two: Age is a substantial negative indicator of elderly people's e-commerce adoption.

Married people are more likely to value time and have greater spare money, increasing their willingness to use e-commerce. Married respondents and ethnic minorities were not found to have reduced Internet access, according to Zhu and Chen (2013). When compared to unmarried persons, Liebermann and Stashevsky (2002) found that married people perceive much larger hazards over the Internet, such as Internet credit card theft and disclosing personal information. According to Hashim et al. (2009), respondents who are divorced or widowed have a greater rate of engaging in Internet commerce than those who are single, while those who are married have the lowest rate.

Hypothesis Three: Marital status is a substantial positive indicator of elderly people's e-commerce adoption.

People who live with others are more likely to use computers and adopt e-commerce because they can educate each other and ask each other for help if they get stuck on a job. Taylor et al. (2003) discovered that those who had children at home were identified to be associated with Internet use from home. Living alone or with someone stood out as a significant factor among the older adult Internet user, according to Berner et al. (2015). Being exposed to the Internet, and being able to ask for help if something goes wrong are all likely relevant factors.

Hypothesis Four: Residential status is a substantial positive indicator of elderly people's e-commerce adoption.

Naseri and Elliott (2011) established an adoption model that showed that education, among five other demographic factors, is a good predictor of online shopping. Burke (2002) found that older buyers with more education were more comfortable making purchases online than those with no or limited education. Better education, according to Dani (2017), makes Internet purchases less tempting.

Hypothesis Five: Education level is a substantial positive indicator of elderly people's e-commerce adoption.

According to Chang and Chen (2008), Internet experience is a key moderating component in understanding clients' e-commerce behavior. When clients have a lot of Internet expertise, the quality of the customer interface has a beneficial impact on switching costs, according to their research. The relative relevance of online information declines with increased consumer Internet experience. For customers with a lot of Internet experience, offline information becomes more relevant. Cheema and Papatla (2010) found that consumers' faith in information from online search engines reduces as the Internet experience increases. The findings of Hernández et al. (2010) indicated that the effect of the Internet experience on e-commerce perceptions changes with the purchase experience, but the influence of purchasing experience remains

constant for all consumers. Because experienced e-customers are well-versed in the medium used, engagement with a difficult website is unlikely to lead them to leave the purchase process. Corbitt et al. (2003) found that older people who have more experience using the internet are more likely to buy things from the Internet. This means that people who haven't used the internet much are less likely to use it.

Hypothesis Six: Information technology experience is a substantial positive indicator of elderly people's e-commerce adoption.

A person's employment position is a crucial component in explaining e-commerce adoption. Workers are more likely than jobless people to make an online purchase, according to Pérez-Hernández and Sánchez-Mangas (2011). Kaye et al. (2009) discovered that employment had a considerable impact on computer and internet usage among people with disabilities. Job and occupational positions significantly increase people's likelihood of using the Internet as they get older. Wilson et al. (2003) found that individuals who were working full-time were more likely to have computer and internet access at home.

Hypothesis Seven: Employment status is a substantial positive indicator of elderly people's e-commerce adoption.

The study by Siyal et al. (2006) highlights the significance of income level as a key determinant in the adoption of e-commerce, showcasing how affluent individuals in Singapore are more inclined to embrace innovative ideas. This finding underscores the role of financial capacity in driving e-commerce readiness. Additionally, the research conducted by Clarke et al. (2015) sheds light on the impact of various demographic factors on e-commerce consumption. Age, wealth, location (rural vs urban), and proximity to traditional stores emerge as crucial factors influencing e-commerce usage, emphasizing the importance of considering these demographic discriminators when analyzing e-commerce expansion in the grocery retail sector.

Hypothesis Eight: Income is a substantial positive indicator of elderly people's e-commerce adoption.

4. Research design

The impact of older Greek consumers' attitudes on online shopping behavior is the topic of this study. In particular, the impact of individual characteristics on consumers' online buying behavior is investigated in connection to gender, age, residential status, IT experience, marital status, income, education level, and employment status. This study uses a self-administered structured questionnaire survey to investigate these topics.

A study was conducted to get consumer opinion to measure e-commerce engagement. Individuals who are both existing and potential e-commerce users are referred to as consumers. Participants in this research were Greek citizens, above 50 years old, and lived in a big city in Greece. Based on the findings of earlier studies and a pilot trial, a structured questionnaire was created. This method was chosen for its cost-effectiveness and simplicity of administration. Furthermore, it ensures that responders remain anonymous, allowing them to react honestly without fear of penalties (Lipovetsky and Conklin, 2004). Because the participants were chosen at random, it is expected that the results will reflect reality (Bagchi, 2005). A total of 250 questionnaires were issued, and after four weeks, 153 forms were received, of which 116 were kept for final analysis because the remaining forms were not entirely filled.

5. Results

Demographic Profile

The demographic profile of the responders is shown in Table 1. According to the findings, males account for 47.4 percent of the 116 respondents, while females account for 52.6 percent. The age group 60 to 69 had the most respondents (34.5 percent), followed by 50 to 59 (29.3 percent). One-fourth of the respondents are between the ages of 70 and 79 (22.4 percent), with the remaining 13.8 percent being over the age of 80.

The majority of respondents (69 percent) are married, followed by widowed (20.7 percent), separated or divorced (5.2 percent), and single (5.2 percent). Additionally, 50.9 percent of the respondents are living with a spouse/partner, 28.4 percent are living with relatives, 19.0 percent are living alone, and 1.7 percent are living in a nursing facility.

Table 1: Demographic profile of the respondents

Gender distribution			Marital status distribution		
Gender	N	Percent	Marital status	N	Percent
Male	55	47.4	Divorced	6	5.2
Female	61	52.6	Single	6	5.2
Total	116	100.0	Married	80	69.0
			Widowed	24	20.7
			Total	116	100.0
Age distribution			Monthly income distribution		
Age group	N	Percent	Monthly income	N	Percent
50-59	34	29.3	Less than 500€	20	17.2
60-69	40	34.5	501€ to 800€	29	25.0
70-79	26	22.4	801€ to 1200€	40	34.5
80-89	15	12.9	1201€ to 1800€	25	21.6
90-99	1	0.9	Above 1801€	2	1.7
Total	116	100.0	Total	116	100.0
Residential status distribution			Education level distribution		
Residential status	N	Percent	Education level	N	Percent
Living with family	33	28.4	Primary school	19	16.4
Living with spouse	59	50.9	Secondary school	42	36.2
Living alone	22	19.0	Bachelor's degree	46	39.7
Living in residential home	2	1.7	Above bachelor's degree	9	7.8
Total	116	100.0	Total	116	100.0
User experience with technology			Job status distribution		
User experience	N	Percent	Job status	N	Percent
Too bad	15	12.9	Unemployed	4	3.4
Bad	19	16.4	Self-employed	4	3.4
Neither good nor bad	41	35.3	Employed	35	30.2
Good	33	28.4	Household	5	4.3
Too good	8	6.9	Retired	68	58.6
Total	116	100.0	Total	116	100.0

In terms of academic achievement, the majority of respondents (39.7 percent) have a bachelor's degree, followed by respondents with secondary school education (36.2 percent), 16.4 percent having primary school education, and only 7.8 percent having postgraduate education. In terms of information technology experience, the results suggest that 35.3 percent of respondents have moderate IT experience, while 33 out of 116 respondents (or 28.4 percent) have good IT experience. One-third of the respondents (29.3 percent) say that they have a bad or too bad IT experience, while 6.9 percent say they have a too good IT experience.

More than half of the respondents (58.6 percent) are retired, while approximately a third (30.2 percent) were working at the time of the survey. They worked in household activities at 4.3 percent of them, were unemployed at 3.4 percent, and were self-employed at 3.4 percent of cases. According to the respondents' monthly income statistics, 34.5 percent make between 801€ and 1200€ per month, while 25 percent earn between 501€ and 800€ per month, 21.6 percent earn between 1201€ and 1800€ per month, 17.2 percent earn less than 500€, and 1.7 percent earn more than 1200€ per month.

Correlation Matrix

The amount of multicollinearity issues in the Pearson correlation matrix for the extent of e-commerce adoption was investigated (Table 2). The aggregated measure of employment and age had the strongest squared correlation among the independent variables of 0.40. None of the squared correlations were close to 0.80, indicating that there was no evidence of significant multicollinearity among the research variables (Hair et al. 1995).

Table 2: Correlation matrix for the extent of e-commerce adoption

	gender	age	marital	residential	education	IT_experience	employment	income	adoption_level
gender	1.000								
age	-0.140	1.000							
marital	0.224*	0.348**	1.000						
residential	-0.102	0.549**	0.093	1.000					
education	-0.140	-0.561**	-0.206*	-0.419**	1.000				
IT_experience	-0.062	-0.109	-0.079	-0.036	0.109	1.000			
employment	-0.013	0.636**	0.235*	0.426**	-0.348**	-0.234*	1.000		
income	0.181	0.311**	0.089	0.118	-0.426**	0.027	0.142	1.000	
adoption_level	0.007	0.316**	0.042	0.273**	-0.196*	0.003	0.320**	0.076	1.000

* $p < 0.05$; ** $p < 0.01$

Hypotheses Testing

Discriminant analysis was used to examine the individual hypotheses about the decision to adopt e-commerce. Discriminant analysis is a method for examining the differences between two groups in terms of two or more independent variables at the same time. When the dependent variable is categorical (e.g. adopters or nonadopters) and the independent variables are interval data, it is the proper statistical procedure (Hair et al. 1995).

Table 3 displays the findings of the discriminant analysis. The whole model was significant, according to Wilks' lambda of 0.697 ($\chi^2 = 39.68$, $df = 8$, $P = 0.0000$). The degree of prediction accuracy evaluated by the

percentages of instances classified properly is another metric of the discriminant function's efficacy. The discriminant function accurately identified 80.02 percent of the individuals in the sample. Adopters and nonadopters had individual correct classification rates of 64 percent and 65.9 percent, respectively.

The independent variables that are significant discriminators between the two groups are identified by the probability for the F-statistics. The discriminant loadings or structural correlations illustrate the relationship between a variable and the discriminant function. The discriminant loadings represent the variance that the independent variables share with the discriminant function and can be used to evaluate each independent variable's relative contribution to the discriminant function. According to Hair et al. (1995), any variable with discriminant loadings larger than or equal to 0.30 is generally considered important.

Hypotheses 2, 4, 5, 7, and 8 were all supported by the results. Age, residence status, education level, employment status, and income level all had a major impact on e-commerce adoption. The decision to use e-commerce was unaffected by gender, marital status, or technological experience (Table 3).

Table 3: Discriminant analysis for the extent of e-commerce adoption

Variables	F-value	Significance	Discriminant loadings
age	30.667	0.000	0.787
employment	16.571	0.000	0.578
education	15.871	0.000	-0.566
residential	9.884	0.002	0.446
income	5.452	0.021	0.332
gender	2.194	0.141	0.210
marital	0.232	0.631	0.068
IT_experience	0.001	0.976	0.004

Age, employment, education, and residential status show significant relationships with the discriminant function, while income, gender, marital status, and IT experience have weaker associations.

6. Discussion and findings

The purpose of this study was to learn more about e-commerce adoption among the elderly by identifying characteristics that influence e-commerce adoption and usage in Greece. It proposed and scientifically evaluated an e-commerce adoption model. The results show that the model was significant, with the discriminant function correctly identifying 80.02 percent of the sample members.

Age is the most important factor in determining the level of e-commerce adoption. This is hardly surprising, given that elderly individuals frequently struggle with technology. This is in line with past adoption research findings (e.g. Ariansyah et al.). This is expected because it is rare for an older person to have used technology and the internet during his productive years, so making online purchases is something he does not completely comprehend or require.

According to the findings of the study, employment status has a considerable beneficial impact on e-commerce adoption. Previous research has also found that people's job and occupational status considerably boost their likelihood of using the Internet for online purchases (e.g. Wilson et al., 2003). This could mean that as older people retire, their willingness to use the internet drops dramatically.

The use of e-commerce by senior adults was found to be linked to their educational level. This data supports prior research claims (e.g. Naseri and Elliott, 2011) that education is one of several characteristics that influence online shopping. This could indicate that highly educated people work in environments where computers are used, boosting their application knowledge, skill levels, and computer-skills support networks. Our findings contradict Dany's assertion (2017) that more education makes internet purchases less appealing.

Taylor et al. (2003) and Berner et al. (2015) have identified residence status as an individual factor that impacts e-commerce adoption. The outcomes of this study support the above hypothesis, indicating that older individuals who live with others are more likely to use computers and adopt e-commerce because they can educate one another and seek help if they get stuck on a work.

As predicted by previous research, income level was found to be a determinant element of e-commerce adoption among the elderly (Siyal et al., 2006; Clarke et al., 2015). As consumers' salaries rise, so will their consumption, until they reach a saturation point.

Finally, the remaining individual characteristics of gender, marital status, and information technology experience have no significant direct effect on older people's decision to use e-commerce, contradicting previous research.

Table 3 demonstrates that gender has no significant influence on the level of e-commerce adoption by older persons, which contradicts the reasons made in the hypothesis development. For example, according to Lian and Yen (2014), men prefer to shop online more than women because they perceive compatibility, complexity, and relative advantage to be more favorable.

In terms of marital status, the findings demonstrate that there is no correlation between being single and e-commerce adoption. The findings contradict prior studies (e.g. Hashim et al., 2009) which revealed that respondents who are divorced or widowed have a greater rate of engaging in electronic commerce, followed by single respondents, and finally married respondents.

The data show that persons with prior IT experience are less likely to adopt e-commerce. This study does not appear to be compatible with Corbitt et al. (2003), who showed that elderly people are more likely to purchase from the Internet if they have more expertise with it, while inexperienced persons are less likely to do so.

Implications

The study added to the previous literature in various ways while also emphasizing the importance of understanding the present condition of e-commerce adoption among the elderly. This study was the first to examine the individual characteristics that determine the degree of e-commerce adoption, as well as to evaluate the application of numerous hypotheses among older individuals. Furthermore, studies that looked at the determinants of e-commerce adoption usually tended to focus on one, two, or three at most four distinct variables, rather than the eight revealed in this study. Because it tested hypotheses that had been tested using younger people with older people, our understanding of individual traits that influence e-commerce adoption was strengthened, resulting in the contribution of new insights.

For more than a decade, Greece has been forced to unprecedented austerity, with disastrous implications for the economy and everyday lives of Greek inhabitants. Studies have shown that e-commerce is a useful strategy for minimizing the effects of a crisis and boosting the economy. Given that many Greek seniors have yet to adopt B2C e-commerce, this study uncovered five factors that influence older consumers' online activity and could help improve Greece's social welfare and economy. Allowing older people to use e-commerce has the potential to improve their quality of life by empowering them, retaining their independence, and reducing their reliance on others.

7. Limitations and Future Research

There are some limitations to this study that can be explored in future research. First, while the current study was limited to Larisa (the 5th largest city in Greece), comparative research might be conducted in other regions of the country, particularly in rural areas, where significant cultural differences may exist.

Another study limitation was snowball sampling. While a problem of selection bias may restrict the sample's validity, this sampling strategy provided a way to reach older people among the most vulnerable and impenetrable social groups, as older people are among the most difficult persons to interview. The problem of selection bias, on the other hand, can be somewhat addressed by producing large samples and duplicating results to enhance any generalizations.

More research on older people's adoption of e-commerce, with an emphasis on diverse facets of e-commerce, might be conducted. E-mobile, e-banking and pharmacy websites, are just a few examples. There is very little study on older people's uptake of e-commerce. Future study is needed on the following topics: the effects of age-related impairments on accessibility, e-commerce adoption among older persons of various demographics, and the hurdles to e-commerce adoption among older people.

8. Disclosure of interest

The authors of this publication declare there is no conflict of interest.

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