

# EVALUATING AGE BIAS IN E-COMMERCE

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HUMANISE

# Acknowledgement of Country

We acknowledge the Elders – past, present and emerging of all the land we work and live on and their Ancestral Spirits with gratitude and respect.

I acknowledge the people of the Kulin nations, the traditional owners of the land on which I am meeting with you from today.

# Background

## Age bias

- Software applications designed for a generic target end user <sup>1,2</sup>
- End-users' diverse ages often not accommodated <sup>1,2</sup>
- More older people using eCommerce (COVID-19 related)<sup>3</sup>
- Research focuses on age bias in software industry <sup>4</sup>

<sup>1</sup> S. Wirtz, et al, in *Proceedings of the IEA*, 2009(17); <sup>2</sup> A. Kavcic, in *Eurocon 2005 - The International Conference on Computer as a Tool*, 2005; <sup>3</sup> Australia Post, "Inside Australian Online Shopping 2020 eCommerce Industry Report," 2020; <sup>4</sup> U. Schloegel, et al, *Inf. Technol. People*, 2018; <sup>5</sup> U. Schloegel, et al, *J. Syst. Softw.*, 2016 (121); <sup>6</sup> U. Schloegel, et al. *Inf. Softw. Technol.*, 2018(97).



# Addressing bias in software

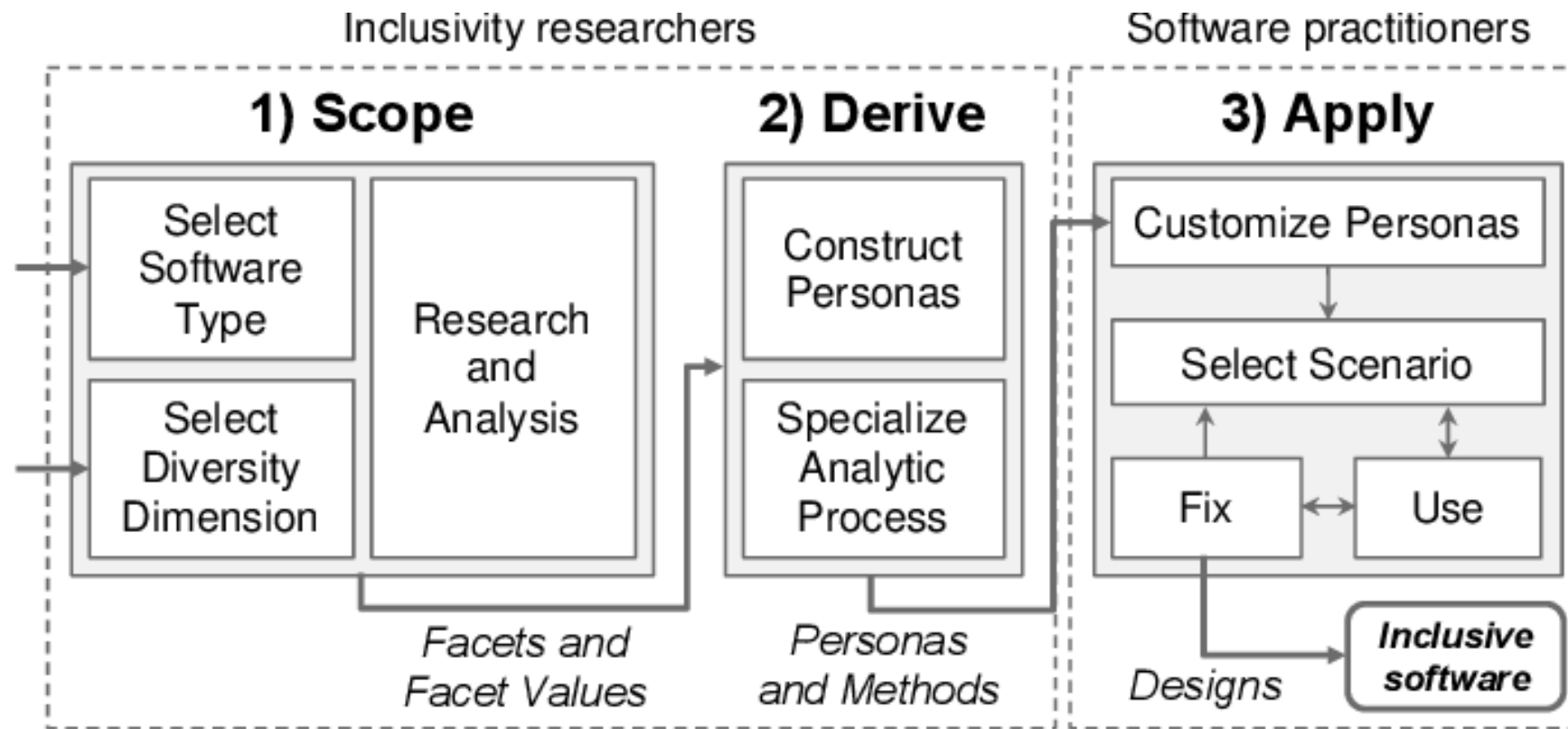
**GenderMag** to evaluate and address potential gender bias in software applications<sup>7</sup>

**InclusiveMag** to increase software inclusivity in under-served populations<sup>8</sup>

<sup>7</sup> M. Burnett et al., *Interact. Comput.*, 2016, 28(6); <sup>8</sup> C. Mendez, et al, in *Proceedings of IEEE Symposium on Visual Languages and Human-Centric Computing*, 2019

# InclusiveMag

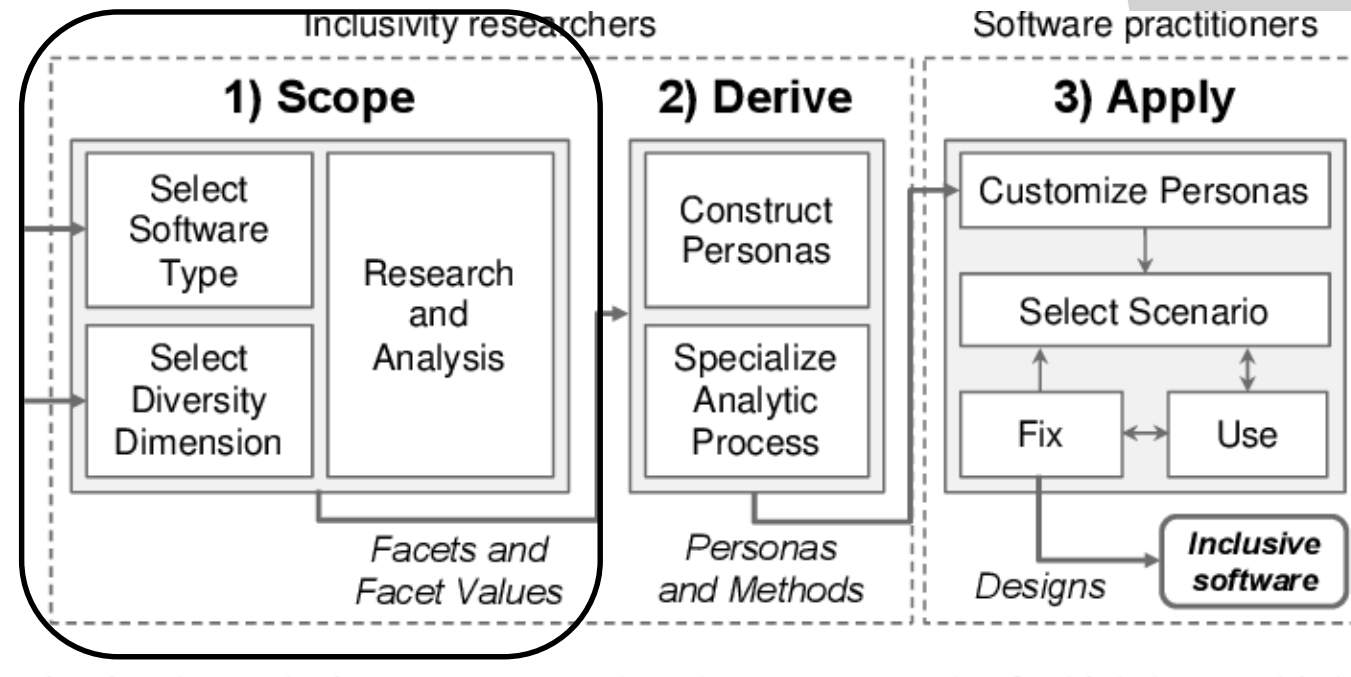
## Scope, Derive, Apply<sup>8</sup>



<sup>8</sup> C. Mendez, et al, in *Proceedings of IEEE Symposium on Visual Languages and Human-Centric Computing*, 2019

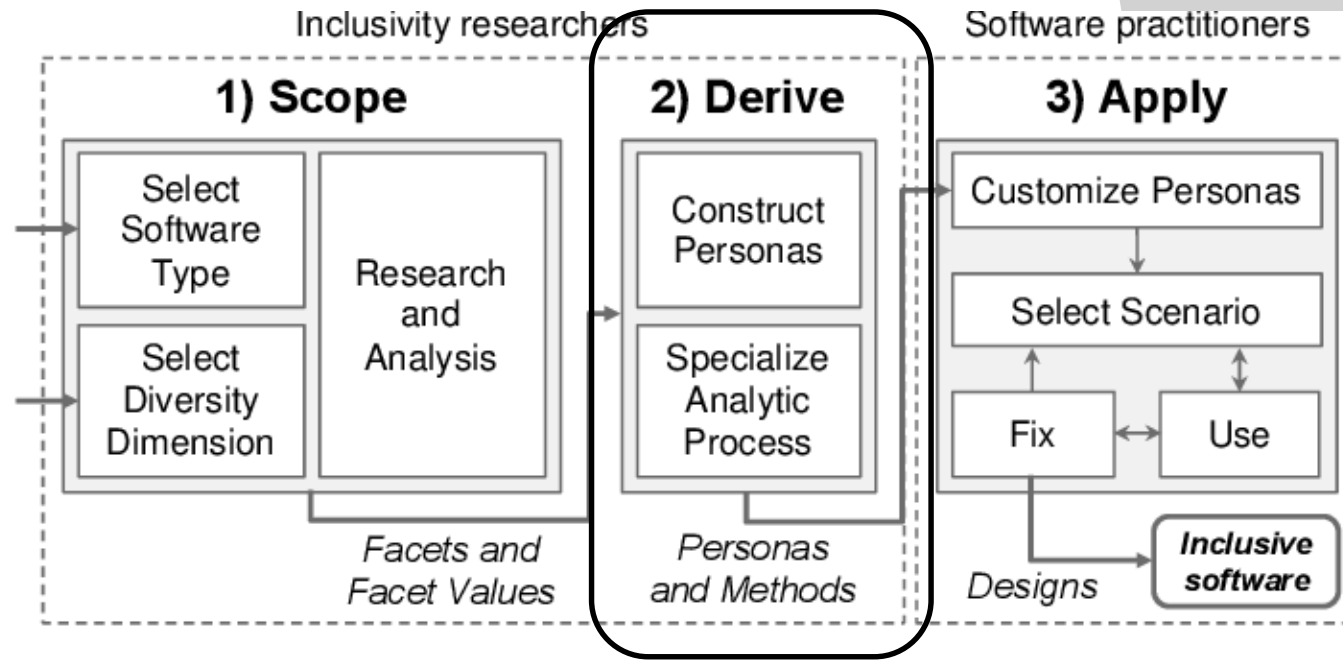
# Methods

1. Scope: describe facets of people of different ages that are important in using e-commerce software



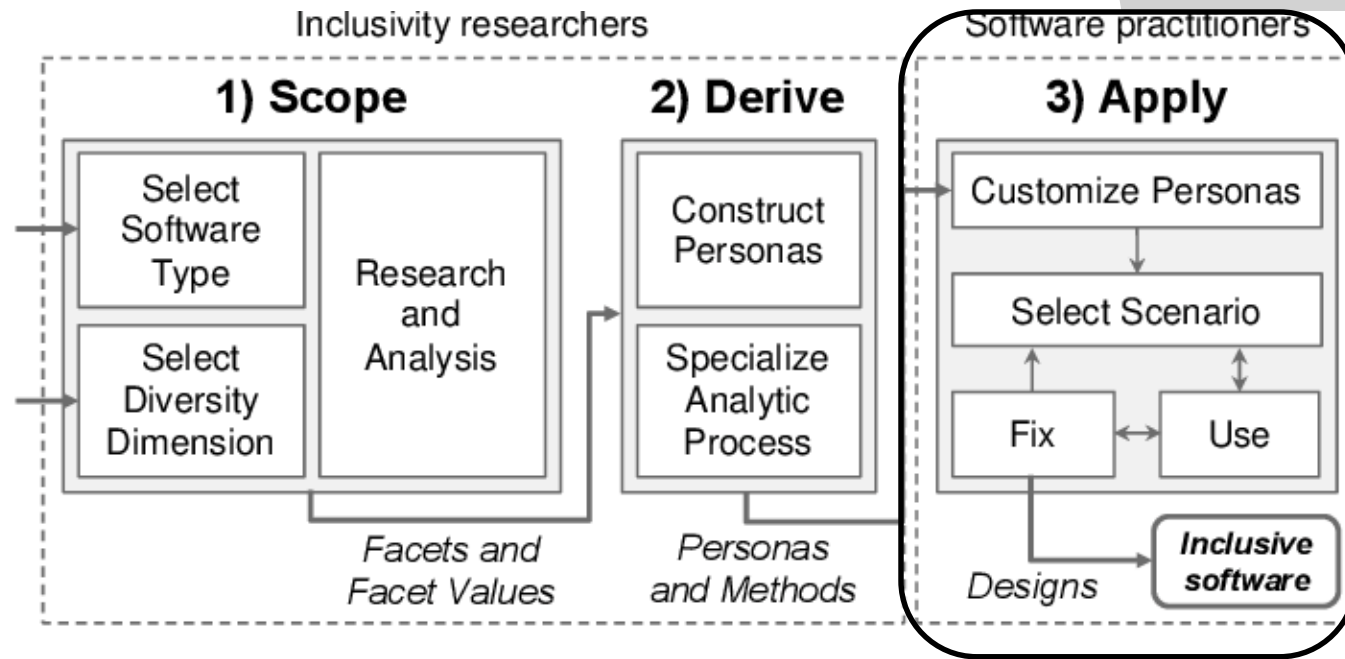


# Methods



2. Derive: use the facets (1) to develop representative personas to personify up to three people of various ages

# Methods



3. Apply: analyse eCommerce software using the personas to evaluate them for bias using a 'Cognitive Walkthrough'<sup>10</sup>



# Methods

## 1. SCOPE:

*Qualitative interviews*

*Observation of people  
when using an eCommerce  
application*

### Age groups\*:

**Generation Z & Generation Y (born 1981-2002)**

**Generation X (born 1965-1980)**

**Baby Boomers (born 1946-1965)**

**Silent Generation (born 1928-1945)**

**\*over 18**

### Facets <sup>11-18</sup>

**Technical proficiency**

**Risk aversion**

**Visual impairment**

**Attention**

<sup>11</sup> D. L. Murman, *Semin. Hear.*, 2015 36(3); <sup>12</sup> E. Hargittai, *arXiv*, 2001 preprint; <sup>13</sup> K. Trinder, et al, , "Learning from Digital Natives: Bridging Formal and Informal Learning. Final Report," 2008; <sup>14</sup> S. Albert and Duffy, *Neurosci. Neuroeconomics*, 2012 (1); <sup>15</sup> M. G. Morris and V. Venkatesh, *Pers. Psychol.*, 2000 53(2); <sup>16</sup> P. J. Trocchia and S. Janda, *J. Consum. Mark.*, 2000 17 (7); <sup>17</sup> Y. Wun, *Fam. Pract.*, 1997 14(4); <sup>18</sup> D. J.

# Methods

## 2. DERIVE:

Qualitative analysis:

- inductive thematic analysis by generation
- Deductive mapping of facets

Development of personas that represent each generation<sup>19, 20</sup>



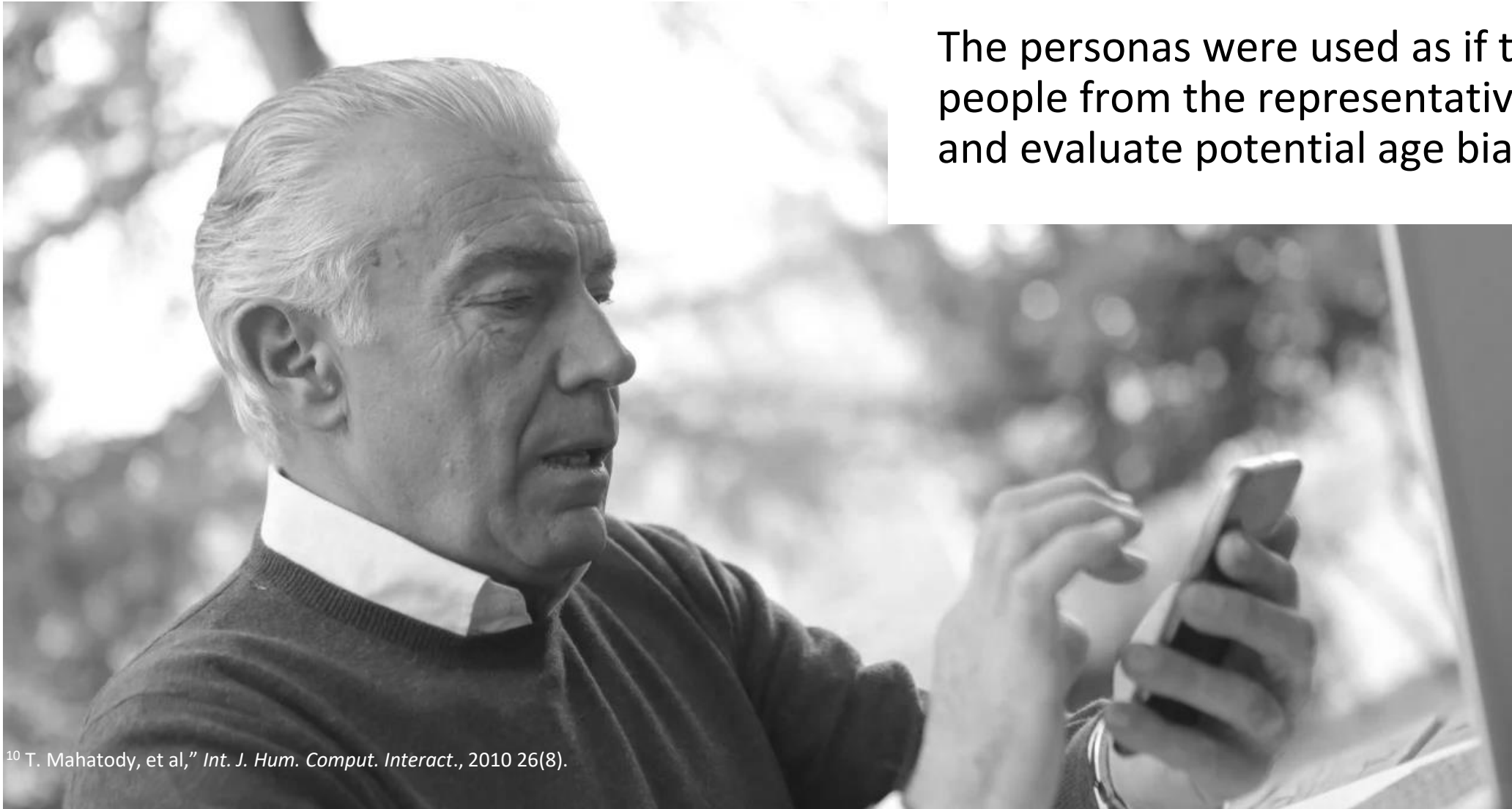
<sup>19</sup> L. Laporte, et al. in *Proceedings of the 7th Nordic Conference on Human-Computer Interaction: Making Sense Through Design*, 2012; <sup>20</sup>T. Miaskiewicz, et al. in *Proceedings of the SIGCHI conference on human factors in computing systems*, 2008.

# Methods

## 3. COGNITIVE WALKTHROUGH:

The personas were then used to perform a cognitive walkthrough with two common e-commerce websites, Amazon and Alibaba.

The personas were used as if they were real people from the representative age groups, and evaluate potential age bias <sup>10</sup>



<sup>10</sup> T. Mahatody, et al, " *Int. J. Hum. Comput. Interact.*, 2010 26(8).

# Results



Generation Z and Y:  
9 participants (3 female, 6 male),  
Facets: Risk was the only facet that came up from the interviews



Generation X:  
5 participants (4 female, 1 male),  
Facets: Risk was also an issue



Baby boomers:  
4 participants (2 female, 2 male),  
Facets: Risk was also an issue



Silent generation:  
6 participants (2 male, 4 female),  
Facets: Risk, technical proficiency, visual impairment were all facets that were affected during the use of eCommerce



# Results

## Technical proficiency

		Generation YZ (9) (%)	Generation X (5) (%)	Generation BB (4) (%)	Silent Generation (6) (%)
Internet usage	none	0	0	0	0
	monthly	0	0	0	0
	weekly	0	0	0	0
	daily	100	100	100	100
Number of internet services used	none	0	0	0	0
	1 - 2 services	55.56	0	25	100
	3+ services	44.44	0	75.00	0
Number of devices	0	0	0	0	0
	1-2	44.44	60	75	100
	2+	55.56	40.00	25.00	0
Ecommerce usage	none	0	0	0	100
	monthly	55.56	20.00	0	0
	weekly	0	40.00	50.00	0
	daily	44.44	40.00	50.00	0
Sold items using e-commerce	no	44.44	20.00	50.00	100
	yes	55.56	80.00	50.00	0

# Results

## Risk

Most 18-74 year olds (77%) had concerns about some risks of using eCommerce.  
All 74+ had major risk concerns.

### Themes: Ways to mitigate risk

1. Brand recognition: A majority of the participants raised brand recognition as a large consideration before making a purchase decision
2. Security and Privacy: saving passwords, credit card details and/or banking details on websites, providing personal details were all issues that were brought up
3. Trustworthiness: People were commonly concerned if they could trust that they would even get their purchases or not

"Like you find kind of feel like Amazon is a safe option. You know, people use it all the time. And eBay is safe. People use it all the time." - GenYZ03

"...like asking for your location, and asking for a lot of private information, then I will just refuse to use their website." - GenBB19

"I was lied to once, and I no longer buy from them anymore." - GenX10

# Results

## PERSONAS: Two personas were developed:

1. 'General persona' 18-74 yr old;



General user persona (18-74 years)

<ul style="list-style-type: none"><li>• <b>Uses internet every day</b></li><li>• <b>Uses e-commerce application mostly for buying all sorts of products</b></li><li>• <b>Very rarely uses for selling things</b></li></ul>	<ul style="list-style-type: none"><li>• Brand is important however does not always read reviews. Information such as easy return policy, fast delivery times are important</li><li>• Prefers easy navigation of a website</li><li>• Does not like cluttered interface/interface with too much information, ads and so on</li></ul>
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**Trusts secure payment method, however not comfortable with storing card details**

2. 'Elderly persona' 74+



Elderly user persona (74+ years)

<ul style="list-style-type: none"><li>• <b>Uses internet every day</b></li><li>• <b>Does not do online shopping at all</b></li><li>• <b>Due to COVID -19 has done some online shopping</b></li><li>• <b>Has trouble navigating and finding the right item</b></li></ul>	<ul style="list-style-type: none"><li>• There is too much information however they could understand the bulk of what is on websites. The font size is sometimes difficult to read as it can be too small</li><li>• Faced difficulty to locate specific thing on the application. Every time had to ask for help to add items to the cart. Does understand the function of log in and out and usually crosses out the screen once shopping done</li></ul>
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**Likely to give up rather than try to resolve a problem**



# Results

**COGNITIVE WALKTHROUGH:** Two personas used in Ali Baba and Amazon websites  
Instructed to buy a printer and find what might be currently 'on offer'

1. 'General persona' 18-74 yr old;

2. 'Elderly persona' 74+



'General users' read information and compare products before buying. They found features such as "Today's deal" on Amazon very helpful for them.



'Elderly users' needed help to search for suitable products and complete an order.

They had difficulty interpreting a lot of information presented about a product such as minimum order limitation on Alibaba.com.

This demonstrated there was limited technical proficiency when using the e-commerce website as well as problems with attention.

# Conclusions

- Our research provides a baseline for evaluating age bias in e-commerce applications.
- We found no conclusive evidence to suggest that the facets, Technical Proficiency and Vision Impairment had an influence on the younger groups' (Gen YZ, X and BB) and e-commerce applications.
- Technical Proficiency and Vision Impairment affected the Silent Generation's behaviour when engaging with e-commerce consistent with studies that suggest the older generation are not as technically skilled <sup>12,13</sup> & that eyesight deteriorates with age <sup>17</sup>
- We would argue that augmenting ways to improve access for people with reduced technical proficiency, who are risk averse and have diminished sight, and would greatly benefit older people based on our findings.
- To increase the validity of our results, we would suggest further research with a broader sample to gain more granular data and find solutions to some of these issues.

<sup>12</sup> E. Hargittai, *arXiv*, 2001 preprint; <sup>13</sup> K. Trinder, et al, , "Learning from Digital Natives: Bridging Formal and Informal Learning. Final Report," 2008; <sup>17</sup> Y. Wun, *Fam. Pract.*, 1997 14(4)

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