Appendix 1:

Evolutionary timelines for Home Entertainment Electrical and Electronic Equipment

1. Evolution of audio speakers

1800s

Since 1861, when Johann Philipp Reis installed the first electric loudspeaker in a telephone prototype, many scientists and inventors such as Alexander Graham Bell, Ernst Siemens and Oliver Lodge created loudspeaker designs driven by compressed air vibrating through metal horns, which were the prototypes for the modern dynamic loudspeakers.

In 1895, the first commercial phonograph (i.e. turntable) was introduced.

(Techsounded, 2018; Hall, 2013)

Image 1. Edison Home Phonograph of 1890s
(Library of Congress, 2018)

Early 1900s

In 1915, Peter Jensen and Edwin Pridham invented the first practical dynamic audio speakers.

The first commercial loudspeakers were first sold in 1926 by the brand Radiola, offering a remarkably improved listening experience for consumers.

From WWI until WWII, audio speaker technologies developed at a fast rate, encouraging consumer purchases.

Stereo sound was developed in the mid-1930s.

By 1946, phonographs were a household commodity for consumers.

(Techsounded.com, 2018; Boom Speaker, 2016; Hall, 2013)

Image 2: Radiola loudspeaker of 1926 (Radiola Guy, 2018a)

Image 3. Remler Phonograph/Radio of 1946 (Radiola Guy, 2018b)

Late 1900s

In the 1960s consumer electronics became mobile (e.g. pocket radios, Philips compact cassette tapes). Throughout the '60s and '70s, the on-going affordability of phonographs made them a fixture in consumers' homes.

In the 1980s compact disc players were introduced, causing phonographs to go obsolete.

Dolby surround-sound home sets are introduced in 1982; Stereophonic (Stereo) sound becomes available by 1986.

By mid-1990s, wireless and Bluetooth speakers are introduced, reflecting the future of audio entertainment. Speakers became lighter and smaller.

(Hall, 2013; Charry, 2015; Wagner, 2017)

Image 4. Philips portable cassette recorder of 1968
(Wikipedia, 2008)

Modern Audio Entertainment

In the 2000s, technological advances in mobile phones instigated a change in fashion in audio speakers (i.e. in-wall speakers; sound bars) and the development of smart speakers.

(Wagner, 2017)

Image 5. Smart speaker of 2017 by Apple
(Jones, 2017)

2. Evolution of televisions and video players

1927

The first 'mechanical' television was created. Its display screen contained a small motor with a spinning disc and a neon lamp that produced a blurred red/orange-tinted picture smaller than the size of a business card.

1930s

The first 'electronic' black and white (B&W) television was perfected in Britain in 1935, with USA soon to follow (Images 1 and 2).

(Television History: A Timeline 1878-2005, 2016; Tvhistory.tv, 2018)

Image 1. British Model of 1938 (Tvhistory.tv, 2017)

Image 2. USA Model of 1939 (Tvhistory.tv, 2017)

1940s

A ban of TV technology production occurred during WWII. RCA is the first company to design and manufacture a post-war TV model, selling approximately 43,000 units (Image 3). Other companies soon began to copy the RCA chassis by placing it in cabinets of their own design.
After 1948, one in ten Americans owned a TV-set, and approximately 20 TV models were found on the market.

(Tvhistory.tv, 2018)

Image 3. RCA 360-TS model of 1946-1949 (Tvhistory.tv, 2018)

1950s & 1960s

By 1950, there were more than 5 million TV-sets in American homes.
In 1954, RCA launched the first colour television (Image 5), although colour TV sales did not make profits until the 1960's due to the large number of B&W TVs still on the market (Image 6).

(Tvhistory.tv, 2018)

Image 4. RCA CT-100 colour model of 1954 (Tvhistory.tv, 2018)

Image 5. Hotpoint B&W TV-set of 1957 (Tvhistory.tv, 2018)

1970s

In 1972, Westinghouse produced the first LCD panel.
By 1973, TV sales increased exponentially, with 17,368,000 units being sold to replace the older 1950s and 60s sets.
In 1975-1976 VCRs such as Sony's Betamax video recorder and the VHS home recording format were first introduced (Images 7 and 8).

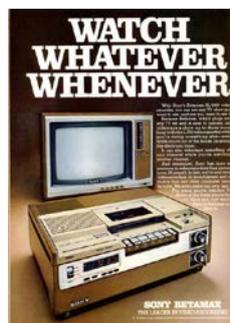(Television History: A Timeline 1878-2005, 2016)

Image 6. Betamax recorder of 1975 (Flickr, 2009)

Image 7. VHS recorder of 1976 (Vintage Electronics, 2017)

1980s

HDTV technology was demonstrated in the USA in 1901 by NHK.

VCR players were a staple in households until the mid-1980s. A shift to CD players is seen after their introduction in 1982, which revolutionised traditional media (Image 9).

(Monaghan, 2018; Television History: A Timeline 1878-2005, 2016; Blu-raydisc.com., 2017)

Image 8. Philips CD-100 Player of 1982 (hi-finews, 2011)

1990s

In 1991, testing of HDTV technology launched in the USA.

In 1993, RCA introduces the first widescreen (16:9 aspect) TV model.

By 1996, 1 billion TV sets were found worldwide (3). Plasma and LCD TVs were in their experimental phases, although CRT TVs still led the market.

In 1999, TiVo personal recorders were introduced, allowing viewers to record, pause, reverse or forward live shows (Image 10).

The first DVD player was introduced in 1997 (Image 11). Digital set-top boxes were also introduced during the '90s.

(Television History: A Timeline 1878-2005, 2016; Monaghan, 2018)

Image 9. TiVo Box Set of 1999 (CNET, 2004)

Image 10. The first DVD players launched in 1997 by Sony, Toshiba and Panasonic (Stump, 2017)

2000s

In 2002-2003, DVD sales surpassed VCR sales; more DVDs than videotapes were rented.

CRT TVs were being replaced by flat-screen displays (Plasma and LCD TVs; Image 12).

In 2007, Apple released their first set-top box, known as Apple TV, which launched a cascade in modern set-top boxes after 2010 (*i.e.* Google Chromecast) (Image 12).

(Television History: A Timeline 1878-2005, 2016) (Williams, 2015)

Image 11. Plasma TV of the mid 2000s (Walmart, 2010)

Image 12. Apple TV of 2007 (Williams, 2015)

2010-Present

After 2010, flat-screen TVs (LCDs and LED-backlit LCDs), completely replaced CRTs.

Modern flat panel "Smart" TVs have capabilities of displaying in high-definition as well as playing content from a USB device or the internet (Image 13).

(Bogner, 2010)

Image 13. Smart TVs introduced from 2013 onwards (Y Magazine, 2016)

3. Evolution of game consoles

1960's: Beginning of the Production of Gaming Consoles

In 1966 Ralph Baer (an employee of defence contractor Sanders Associates) created the first "television gaming apparatus" which included a tennis game and a chase game that you attached to a normal TV set. The first game console was created to meet the US government's demand on a device that would train the reflexes of military personnel.

1st Generation Game Consoles (1972-1976)

1972
The first commercial game consoles were released on the market in 1972, with Magnavox Odyssey (Image 1) and Atari PONG (Image 2). The PONG became a huge success, launching an electronic gaming revolution.

(Miller, 2005; Poh, 2017)

Image 1: Magnavox Odyssey of 1972 (Amos, 2015)

Image 2: Atari PONG of 1972 (pongmuseum.com, 2017)

1976
PONG clones soon followed from several companies (e.g. Coleco's TELSTAR; Image 3)
Fairchild Camera and Instrument released the first programmable home video game system called Channel F (Image 4) in 1976.

(Miller, 2005; Poh, 2017).

Image 3: Coleco TELSTAR of 1976 (Amos, 2012a)

Image 4: Channel F of 1976 (Giant Bomb, 2017a)

2nd Generation Game Consoles (GOLDEN AGE) (1977-1982)
Defined through the creation of programmable video games with better graphics and game-play.

1977
Atari VCS (Image 5) kick-started the Golden Age of game consoles, and went on to sell more than 25 million units over its product lifetime accompanied with 200 different games such as Space Invaders, Asteroids, and Pac-Man

(Miller, 2005; Poh, 2017).

Image 5: Atari VCS also known as Atari 2600 of 1977 (Giant Bomb, 2017b)

1978
Magnavox launched their own programmable video game console known as Odyssey 2 (Image 6). It was more popular in Europe than in the United States, where it was marketed as 'Videopac' by Philips.

(Miller, 2005; Poh, 2017).

Image 6: Magnavox Odyssey 2 or Videopack of 1978 (Wikipedia, 2006)

1980

Mattel launched Intellivision (Image 7) video game system, which featured better graphics than the VCS, exlusive sports games (e.g. NBA Basketball, NFL Football) and was the first video game system to utilize a 16-bit microprocessor.

(Miller, 2005; Poh, 2017)

Image 7: Mattel's Intellivision of 1980 (8-bit Central, 2017)

3rd Generation Game Consoles (1982-1984) (Dark Ages)
An abrupt drop in sales begins in 1982, due to the expansion of unoriginal or poor-quality gaming systems.

1982

The most prominent 3rd generation gaming system was Coleco's Colecovision (Image 8) of 1982. It featured high-quality graphics and versions of arcade favourites (e.g. Donkey Kong or Zaxxon) (Miller, 2005; Poh, 2017).

Image 8: Coleco Vision of 1982 (Watcher, 2016)

4TH GENERATION (1983-1989)
Defined through technological innovations for lower-cost memory chips and higher-power 8-bit microprocessors similar to the ones of arcade machines.

1983

Nintendo released the Famicon video game system to the Japanese market, selling 2.5 million units in its first year; rebranded as Nintendo Entertainment System (NES) for the US (Image 9). The NES sold more than 3 million units within its first 2 years of release in the US, and globally >65 million units throughout its product lifetime (along with 500 million cartridges) (Miller, 2005; Poh, 2017).

Image 9: Nintendo's Famicon or NES of 1983 (Byford, 2016)

1989

Sega released their first game system in the US; the Sega Master System (or SMS) (Image 10) incorporating plug-in 3D glasses for certain games. Nintendo released their first programmable handheld game system, known as the GameBoy (Image 11): the world's all-time best-selling video game system.

(Miller, 2005; Poh, 2017)

Image 10: Sega's Master System (SMS) of 1989 (Amos, 2011a)

Image 11: Nintendo's GameBoy of 1989 (Giordano, 2016)

5th Generation Game Consoles (1989-1995)

The 5th generation of home video game systems featured 16-bit processors, more detailed graphics, and more imaginative games.

1989

NEC's TurboGrafx-16 (Image 12); marked the beginning of the 5th generation of game consoles. It was also the first console to incorporate a CD player attachment.

Sega Genesis game system (Image 13); rebranded as the Mega Drive in Japan. The game console is known for releasing the Sonic the Hedgehog game in 1991.

Image 12: NEC TurboGrafx-16 of 1989 (Amazon, 2017)

Image 13: Sega Genesis (also known as Mega Drive) of 1989 (Stein, 2017)

Nintendo launched their own 16-bit system known as the Super NES (or Super Famicon in Japan; Image 14). The console included the Super Mario World cartridge and sold 300,000 units overnight upon first release in the U.S. and approximately 46 million units worldwide throughout its lifespan.

(Miller, 2005; Poh, 2017)

Image 14: Nintendo's Super NES (or Super Famicon) of 1989 (Amos, 2013)

1991

Philips released a "multimedia" system capable of playing audio CDs, CDi and CD+G software discs, VCD video CDs, and Karaoke CDs known as the CDi game console (Image 15). The product was unsuccessful because of its high price and lack of quality games (Miller, 2005; Poh, 2017).

Image 15: Philip's CDi game console of 1991 (Amos, 2011b)

1993

3DO Interactive Multiplayer (Image 16); released by Panasonic was the first 32-bit system released in the U.S. (Miller, 2005; Poh, 2017).

Image 16: 3DO game console released by Panasonic in 1993 (Amos, 2012b)

6th Generation Game Consoles (1995-1998)

Featured high-powered microprocessors, very realistic graphics and game-play; outperforming most personal computers of the day.

1995

Sony released their first video game system, the PlayStation (Image 17), incorporating a 32-bit microprocessor. Backed by a large advertising campaign, the console unseated Nintendo and Sega to become the leading home video game system, selling more than 50 million units worldwide.
Nintendo launched Virtual Boy, kick-starting consumer-focused Virtual reality gaming (Image 18).
(Miller, 2005; Poh, 2017; Brown, 2018)

Image 17: Sony's PlayStation of 1995 (Amos, 2010)

Image 18: Nintendo's Virtual Boy of 1995 (Seibert, 2017)

1996
Nintendo released their own sixth-generation game system, the Nintendo 64 (Image 19), incorporating a 64-bit microprocessor. The launch was hugely successful, with 1.7 million units sold in the first three months of release. (Miller, 2005; Poh, 2017)

Image 19: Nintendo 64 of 1996 (Amos, 2011c)

7th Generation Game Consoles (1998-2005)
Video games feature even better graphics, performance, and game play; Microsoft was introduced in the video gaming industry.

1999
Sega released their Dreamcast system (Image 20), incorporating a 128-bit microprocessor and 26MB memory, the Dreamcast ran on Microsoft's Windows CE platform.

(Miller, 2005; Poh, 2017)

Image 20: Sega's Dreamcast game consoles of 1999 (Jarrard, 2017)

2000
Sony released the PlayStation 2 console (PS2; Image 21), powered by a 128-bit "Emoticon Engine" microprocessor and 32MB memory. It sold >1 million units within the first two days of release in Japan, and more than 500,000 units in the USA, thus dominating the video gaming market.

(Miller, 2005; Poh, 2017)

Image 21: Sony's PlayStation 2 of 2000 (Sony, 2018)

2001
Microsoft entered the video game market with the highly anticipated Xbox system, which incorporated a 733MHz Pentium III microprocessor. The Xbox sold approximately 10 million units worldwide within the first two years of release (Image 22).

Image 22: Microsoft's Xbox system of 2001 (Amos, 2014)

Nintendo released the GameCube. The GameCube was Nintendo's first non-cartridge system and sold more than 500,000 units within the first week of release, totalling up to 13 million units 2 years after its release (Image 23).

(Miller, 2005; Poh, 2017)

Image 23: Nintendo's Game cube of 2001 (Amos, 2012c)

Towards the 8ᵗʰ Generation of Game Consoles (2005-Present)

Currently there are 3 major competitors in the market: Microsoft's Xbox series, Sony's PlayStation series and Nintendo.

2005

Microsoft released the original Xbox360 (Image 24), which sold over 80 million units worldwide throughout its product lifetime. Slimmer and more advanced models of the Xbox360 were released in 2010 and 2013 (Image 25) (Poh, 2017).

Image 24: Xbox 360 Original game console of 2005 (Fernandez, 2017)

Image 25: Xbox360 Slim of 2013 (Amos, 2011d)

2006

Nintendo released the Wii game console (Image 26) selling more than 100 million units throughout its product lifetime; popular due to the huge variety of games it incorporated (Poh, 2017). Sony released PlayStation 3 (PS3; Image 27) with sophisticated 60GB hard-drive and wireless internet capabilities. (Altizer, 2017).

Image 26: Nintendo Wii of 2006 (Amazon, 2018a)

Image 27: Sony's PlayStation 3 of 2006 (Lifewire, 2017)

2013

Microsoft released Xbox One (Image 28), marking the 8ᵗʰ Generation of video game consoles. So far, the game console has sold approximately 30 million copies worldwide (IGN, 2013).

Sony released their 8ᵗʰ generation video game console, named PlayStation 4 (PS4; Image 29) (Court, 2013).

Image 28: Microsoft's Xbox One of 2013 (Amazon, 2018b)

Image 29: Sony's PlayStation 4 of 2013 (Game Radar, 2015)

2017

Nintendo released their newest game console, the Switch (Image 30) acting as the first 'hybrid' console, which allows for both portable gaming through a 6.2-inch display, as well and home video gaming through its detachable hand-sets (Nations, 2017).

Image 30: Nintendo Switch gaming console of 2017 (Two Honest Guys, 2017)

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now/ [Accessed 6 Oct. 2017].

Appendix 2:

Original questionnaire administered across the four zones of Southampton

End-of-Life Management of Home Entertainment Products

Dear Participant,

I am a researcher at the University of Southampton, undertaking a study on electronic home entertainment systems involving televisions, speakers, video players and gaming consoles.

Your views are important for this endeavour because they will help with the comprehension and interpretation of community behaviours and opinions regarding the use of electronic home entertainment products and what happens when they reach their end-of-life and you no longer have a use for them.

The following questionnaire should take **less than 15-20 minutes** to complete. All the information you provide will remain confidential. Please read the participant information sheet (attached) for more queries.

Please note that I will be returning to collect this questionnaire in about a week's time from 5-8pm. Please attach the completed questionnaire within the envelope it came in, to make the collection process easier. I will be wearing my university ID to confirm my identity.

Many thanks for taking the time and trouble to help!

Principal Researcher: Ariadne Wilkinson (Faculty of Engineering and the Environment, University of Southampton)

Supervisor: Professor Ian Williams (Faculty of Engineering and the Environment, University of Southampton)

1. **Please indicate the number of home entertainment products that (a) you <u>own</u> and (b) you regularly <u>use</u> (used within the last year) from the following list of product categories. Write down the number of items owned and used from each product category (indicated through the illustration below) in the appropriate boxes of the following table. For zero items from a certain category, please write down '0'.**

For example:

❖ *If you <u>do not own</u> or use a Black and White TV, you must write down the number '0' within both the "Number of items Owned" and "Number of items Used" boxes for this product category.*

❖ *If you own <u>one</u> CRT TV, but don't actually use it in your day-to-day life, you must write down the number '1' within the "Number of items Owned" box and '0' within the "Number of items Used" box for this product category (as seen in the illustrative example below).*

❖ *If you own <u>two</u> Plasma/LCD TVs, and use both of them, you must write down '2' within the "Number of items Owned" box and '2' within the "Number of items Used" box for this product category as well. If you actually only used <u>one</u> of your <u>two</u> Plasma TVs, you would write down '2' within the "Number of items Owned" box and '1' within the "Number of items Used" box (as seen in the illustrative example below).*

Illustrative Example:			
Category	**Illustration of Product Category**	**Number of items Owned**	**Number of items Used**
Black and White TV		0	0
CRT TV		1	0
Plasma/LCD TV		2	1

After you have understood the above example, please turn to page 3 to answer Question 1.

Category	Illustration of Product Category	Number of items Owned	Number of items Used
Black and White TV			
CRT TV			
Plasma/LCD TV			
Smart TV			
VCR player			
DVD player			
Blu-ray player			
Tivo box (Virgin media, Sky TV)			
Apple TV / Amazon fire TV / Google Chromecast TV			
Radio / Portable Radio			
TV Speakers			
Bluetooth / Portable Speakers			
Sony PlayStation 1 (launched in 1995)			

Category	Illustration of Product Category	Number of items Owned	Number of items Used
Sony PlayStation 2 (launched in 2001)			
Sony PlayStation Portable (PSP) (launched in 2004)			
Sony PlayStation 3 (launched in 2006)			
Sony PlayStation Portable Go (PSP Go) (launched in 2009)			
Sony PlayStation 3 Slim (launched in 2009)			
Sony PlayStation Vita (launched in 2011)			
Sony PlayStation 4 (launched in 2013)			
Sony PlayStation 4 Slim / PlayStation 4 Pro (both launched in 2016)			
Original Xbox (2001)			
Xbox360 Original (launched 2005)			

Category	Illustration of Product Category	Number of items Owned	Number of items Used
Xbox360 Slim (launched 2010)			
Xbox One (2013)			
Nintendo 64			
Nintendo GameCube			
Nintendo Gameboy			
Nintendo Gameboy SP			
Nintendo DS			
Nintendo Wii			
Nintendo 3DS			
Nintendo Switch			
Virtual Reality Headset / Gaming			

2. a. Have you <u>stored</u> any home entertainment products you no longer want? Please tick the appropriate box and follow the instructions.

       ☐ Yes (move to Q. 2b, 2c, 2d)

       ☐ No (move to Q. 3)

2. b. Have you stored any Videotape (VHS, Betamax) products?

      ☐ Yes, but I still use my videotape products

      ☐ Yes, and I no longer want/use my videotape products

      ☐ No, I have given away all my videotape products

2. c. Have you stored any DVDs?

      ☐ Yes, but I still use my DVDs

      ☐ Yes, and I no longer want/use my DVDs

      ☐ No, I have given away all my DVDs

2. d. Why did you store the home entertainment products you no longer want? To answer this question please recall your frequent past attitudes and rate the following statements in terms of how much you agree with them from 0 (disagree) to 5 (completely agree).

	Disagree					Completely Agree
"I may need it some day"	0	1	2	3	4	5
"One day I'll find someone to give it to who will really want/appreciate it"	0	1	2	3	4	5
"I paid too much money to just get rid of it"	0	1	2	3	4	5
"I'm too attached to the item/It reminds me of things"	0	1	2	3	4	5
"I don't know what else to do with it (where to give it away), so I keep it"	0	1	2	3	4	5

3. Have you <u>gifted, sold, or disposed of</u> any of your home entertainment products within the last 5 years (since 2012)? Please tick the appropriate box and follow the instructions.

       ☐ Yes (move to Q. 3a, 3b, 3c and 4))

       ☐ No (move to Q. 5)

3. **a. Which home entertainment products from the following list have you gifted, sold, or disposed of? Please tick all appropriate boxes from the following list:**

☐ Black and white TV

☐ CRT TV

☐ Plasma/LCD TV

☐ Smart TV

☐ DVD Player

☐ Blu-ray Player

☐ TiVo box

☐ Apple TV / Amazon fire/ Google Chromecast

☐ Radio / Portable Radio

☐ TV Speakers

☐ Bluetooth / Portable Speakers

☐ Sony PlayStation 1

☐ Sony PlayStation 2

☐ Sony PlayStation Portable (PSP)

☐ Sony PlayStation 3

☐ Sony PSP Go

☐ Sony PlayStation Vita

☐ Sony PlayStation 4

☐ Original Xbox of 2001

☐ Xbox360 Original (Elite)

☐ Xbox360 Slim (launched in 2010)

☐ Xbox360 E (launched in 2013)

☐ Xbox One

☐ Nintendo Wii

☐ Nintendo DS

☐ Nintendo 3DS

☐ Nintendo Gameboy

☐ Nintendo 64

☐ Nintendo GameCube

☐ Other (please specify): …………………….

3. b. How did you gift, sell, or dispose of each home entertainment product you selected in 3a? Please write down which product you got rid of in what way, by writing the product name in the appropriate box as shown in the illustrative example below:

Illustrative Example:	
Sold them online	CRT TV
Gave them to a friend/family member	Sony PlayStation 3, Nintendo Wii

Sold them online	
Gave them to a friend/family member	
Sold them to a CeX shop or similar	
Threw them out via my general waste bin	
Sold them to a family member/friend	
Gave them to charities	
Dumped them somewhere away from my house	
Gave them away through online free recycling	
Took them to a HWRC (Household Waste Recycling Centre)	
Left them outside my house hoping someone would take them	
Threw them out via my recycling bin	

3. **c. Why did you gift, sell, or dispose of those products? Please tick the strongest reason for getting rid of the products from the following list:**

☐ The item I got rid of was dated and broken / showing serious signs of fatigue (not working properly) I needed to replace it

☐ The item I got rid of was working properly, but I wanted to buy a more up-to-date/ higher performance/ newer model

☐ The item I got rid of was new/relatively new (0-5 years old), but had stopped working so I needed to replace it

☐ I was gifted a more up-to-date/ higher performance/ newer model

☐ I decided I did not need that electronic product anymore, nor did I need a replacement model

4. **Which home entertainment products have you gifted, sold, or disposed of within the last 2 years (since 2015)? Please tick all appropriate boxes from the following list:**

☐ Black and white TV

☐ CRT TV

☐ Plasma/LCD TV

☐ Smart TV

☐ DVD Player

☐ Blu-ray Player

☐ TiVo box

☐ Apple TV / Amazon fire/ Google Chromecast

☐ Radio / Portable Radio

☐ TV Speakers

☐ Bluetooth / Portable Speakers

☐ Sony PlayStation 1

☐ Sony PlayStation 2

☐ Sony PlayStation Portable (PSP)

☐ Sony PlayStation 3

☐ Sony PSP Go

☐ Sony PlayStation Vita

☐ Sony PlayStation 4

☐ Original Xbox of 2001

☐ Xbox360 Original (Elite)

☐ Xbox360 Slim (launched in 2010)

☐ Xbox360 E (launched in 2013)

☐ Xbox One

☐ Nintendo Wii

☐ Nintendo DS

☐ Nintendo 3DS

☐ Nintendo Gameboy

☐ Nintendo 64

☐ Nintendo GameCube

☐ Other (please specify): ……………………

5. Which home entertainment products have you bought in <u>addition</u> to the ones you already owned (not as a replacement product) within the <u>last 5 years</u>?

☐ Plasma/ LCD TV

☐ Smart TV

☐ DVD Player

☐ Blu-ray Player

☐ TiVo box

☐ Apple TV / Amazon fire / Google Chromecast

☐ TV Speakers

☐ Bluetooth / Portable Speakers

☐ Sony PlayStation 4

☐ Sony PlayStation Portable Go (PSP Go)

☐ Xbox360 Slim

☐ Xbox360 E

☐ Xbox One (2013)

☐ Nintendo Wii

☐ Nintendo DS

☐ Nintendo 3DS

☐ Nintendo Switch

☐ Virtual Reality Headset / Gaming

☐ Other (please specify):
    …………………………

☐ I have only bought new electronic products to replace your old ones

6. **Where have you purchased your home entertainment products from in the past? Please select all appropriate answers from the following list:**

☐ The products were brand new and bought from an electronics retailer

☐ The products were bought from a second hand shop

☐ The products were bought from a CeX shop

☐ The products were gifted to me by family and friends

☐ The products were bought from family and friends

☐ Other (please specify):…………………………………

7. **Imagine your home entertainment product is still usable, but you no longer have a use for it, and you think it is not worth selling. When deciding whether to <u>store</u> the product or <u>throw it away</u>, what do you think to yourself? Please rate the following statements from 0 (I would never think this) to 5 (I would definitely think this).**

	I would never think this					I would definitely think this
"I associate the product with so many memories"	0	1	2	3	4	5
"It will surely interest someone some day"	0	1	2	3	4	5
"Someday I'll find someone who wants it"	0	1	2	3	4	5
"It would feel like throwing money down the drain"	0	1	2	3	4	5
"It represents money, I can't get rid of it"	0	1	2	3	4	5
"It's too expensive to get rid of it!"	0	1	2	3	4	5
"I may need it some day"	0	1	2	3	4	5
"It may always be of use"	0	1	2	3	4	5

8. **You have been gifted a new home entertainment product. Your old product is still usable, but you think it is not worth selling. In this case, what would you do with your old product? Please rate the following behaviours from 0 (I would never do this) to 5 (I would definitely do this).**

	I would never do this					I would definitely do this
Keep both and use them in different rooms of your home	0	1	2	3	4	5
Get rid of / Give away the old [TV, game console]	0	1	2	3	4	5
Keep the old [TV, game console] and give the new one away	0	1	2	3	4	5

9. **If you decided to <u>keep</u> the old product, what would you think to yourself to justify that decision? Please rate the following statements from 0 (I would never think this) to 5 (I would definitely think this).**

	I would never think this					I would definitely think this
"I may need it some day"	0	1	2	3	4	5
"One day I'll find someone to give it to who will really want it / appreciate it	0	1	2	3	4	5
"I paid too much money for it to just get rid of it"	0	1	2	3	4	5
"I'm too attached to the product/It reminds me of things"	0	1	2	3	4	5
"I don't know what else to do with it (where to give it away), so I keep it"	0	1	2	3	4	5

10. Imagine your home entertainment product is still usable, but you no longer have a use for it, and you think it is not worth selling. Which of the following behaviours will you most likely follow? Please rate the following behaviours from 0 (would never do this) to 5 (would definitely do this).

	I would never do this					I would definitely do this
Give it to charities	0	1	2	3	4	5
Sell it online	0	1	2	3	4	5
Give it to a friend/family member	0	1	2	3	4	5
Take it to a HWRC (Household Waste Recycling Centre)	0	1	2	3	4	5
Sell it to a CeX shop	0	1	2	3	4	5
Throw it out in my general waste bin	0	1	2	3	4	5
Sell it to a family member/friend	0	1	2	3	4	5
Throw it out in my recycling bin	0	1	2	3	4	5
Leave it somewhere away from my house	0	1	2	3	4	5
Give it away through online free recycling	0	1	2	3	4	5
Leave it outside my house for someone to take	0	1	2	3	4	5

11. What home entertainment products are you planning on purchasing in 2018? Please tick all appropriate boxes from the following list:

☐ New plasma/LCD TV

☐ New Smart TV

☐ TiVo box

☐ Amazon fire / Apple TV / Google Chromecast

☐ New Blu-ray Player

☐ New TV/Bluetooth/Portable Speakers

☐ Nintendo Switch

☐ Virtual Reality Headsets / Gaming

☐ Xbox One X

☐ Ataribox by Atari (Launch for Spring 2018)

☐ Sony PlayStation 5 (Launch for end of 2018)

☐ Other (please specify):…………………………

☐ I am not planning on purchasing anything

12. From 0 (disagree) to 5 (completely agree), how much do you agree with the following statements?

	Disagree					Completely Agree
"I like to purchase the newest model of [TV, game console] that is currently out on the market"	0	1	2	3	4	5
"I wait for the product I own to become dated, before I replace it with a newer model"	0	1	2	3	4	5
"I wait for the product I own to break/stop working, before I replace it with a newer model"	0	1	2	3	4	5
"If I keep a HE electronic product [TV or game console] long enough, its monetary value increases"	0	1	2	3	4	5
"I use the "anytime, anywhere" subscriptions such as Netflix, or BBC iPlayer more often than normal TV"	0	1	2	3	4	5
"I normally watch television from my phone or tablet rather than an actual TV"	0	1	2	3	4	5

"I would get rid of my TV and only use my phone or tablet instead"	0	1	2	3	4	5

13. When do you think is an appropriate time to replace your TV?

☐ Every year ☐ Every 6-7 years

☐ Every 2-3 years ☐ Every 8-9 years

☐ Every 4-5 years ☐ Every 10+ years

14. When do you think is an appropriate time to replace your game console?

☐ Every year ☐ Every 6-7 years

☐ Every 2-3 years ☐ Every 8-9 years

☐ Every 4-5 years ☐ Every 10+ years

DEMOGRAPHIC QUESTIONS

Please answer the following questions (Q15-19) by ticking the appropriate boxes.

15. What is your age?

☐ 18-24

☐ 25-44

☐ 45-64

☐ 65+

16. What is your gender?

☐ Female

☐ Male

☐ Other:………………………
…………..

17. What is the highest level of education you have completed?

☐ Higher education at a university or equivalent establishment (PhD, Master's, Bachelor's degree or equivalent)

☐ A levels or equivalent (College)

☐ GCSE's or equivalent (Secondary school)

☐ Primary school

☐ No education

Appendix 3:

Additional Tables and Figures from Results

Table 1. Complete breakdown of home entertainment (HE) electronic products additionally purchased (not purchased as replacement products) by respondents since 2012 (n=138)

HE EEE Categories	Number of respondents (N)	Proportion of respondents (%)
Plasma TV	39	28.3%
Smart TV	51	37.0%
DVD player	4	2.9%
Blu-ray player	8	5.8%
TiVo Box	6	4.3%
Set-Top Box	22	15.9%
TV Speakers	15	10.9%
Portable Speakers	32	23.2%
PS4	28	20.3%
PSP Go	0	0.0%
Xbox360 Slim	1	0.7%
Xbox360 E	0	0.0%
Xbox One	14	10.1%
Nintendo Wii	4	2.9%
Nintendo DS	2	1.4%
Nintendo3DS	6	4.3%
Nintendo Switch	7	5.1%
VR Gaming	5	3.6%
Other	3	2.2%
Only bought new products to replace old	26	18.8%

Table 2. Complete breakdown of respondents' planned purchases for home entertainment (HE) electronic products in 2018 (n=139)

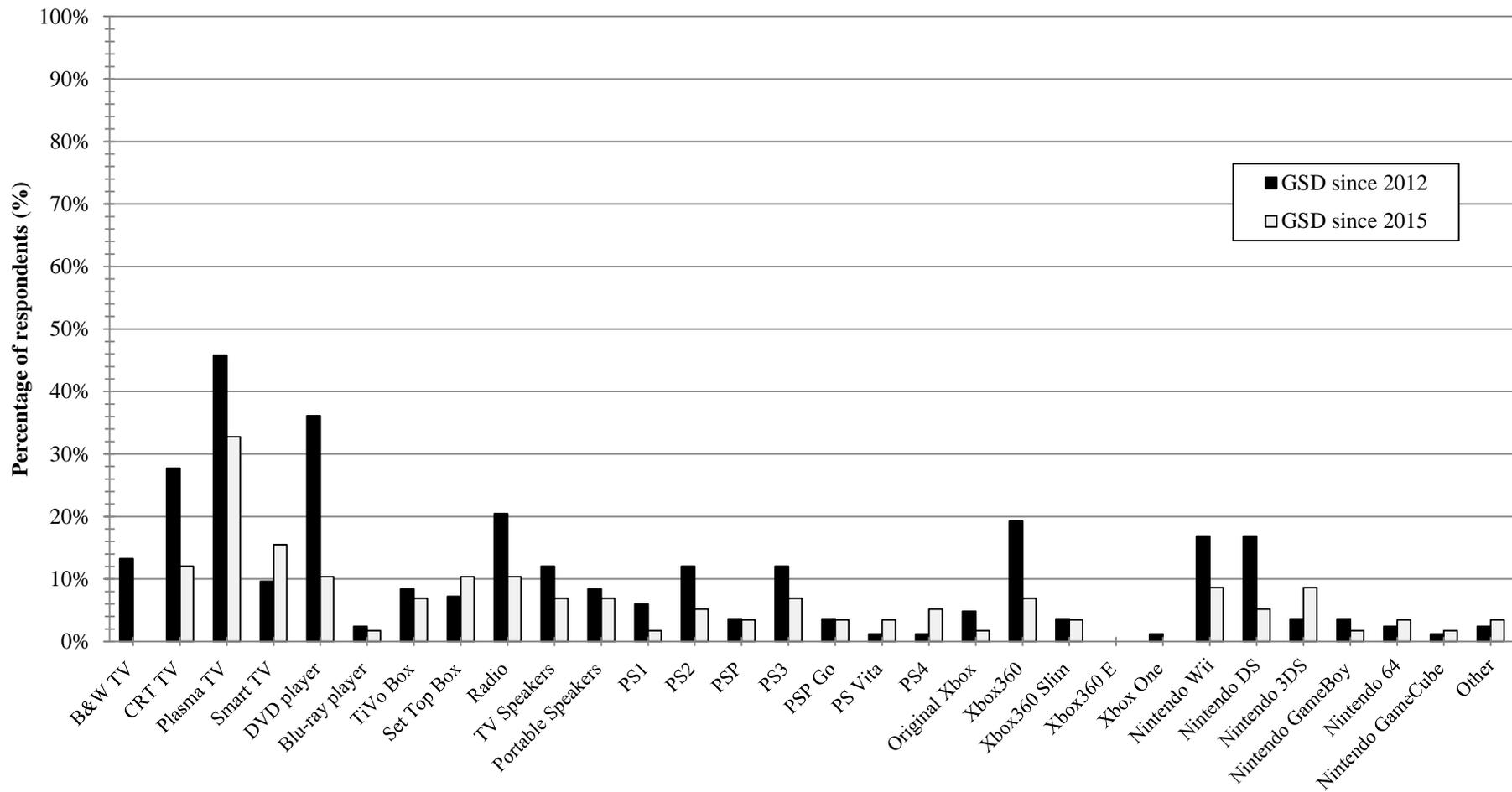| HE EEE Categories	Number of respondents (N)	Proportion of respondents (%)
Plasma TV	3	2.2%
Smart TV	24	17.3%
TiVo Box	1	0.7%
Set-Top Box	10	7.2%
Blu-ray Player	0	0.0%
Portbale Speakers	9	6.5%
Nintendo Switch	7	5.0%
VR Gaming	10	7.2%
Xbox One X	0	0.0%
Ataribox	1	0.7%
Sony PS5	13	9.4%
Other	5	3.6%
Not planning on purchasing anything	83	59.7%

Figure 1. Complete breakdown of HE EEE that respondents gifted, sold or disposed (GSD) of since 2012 vs. 2015
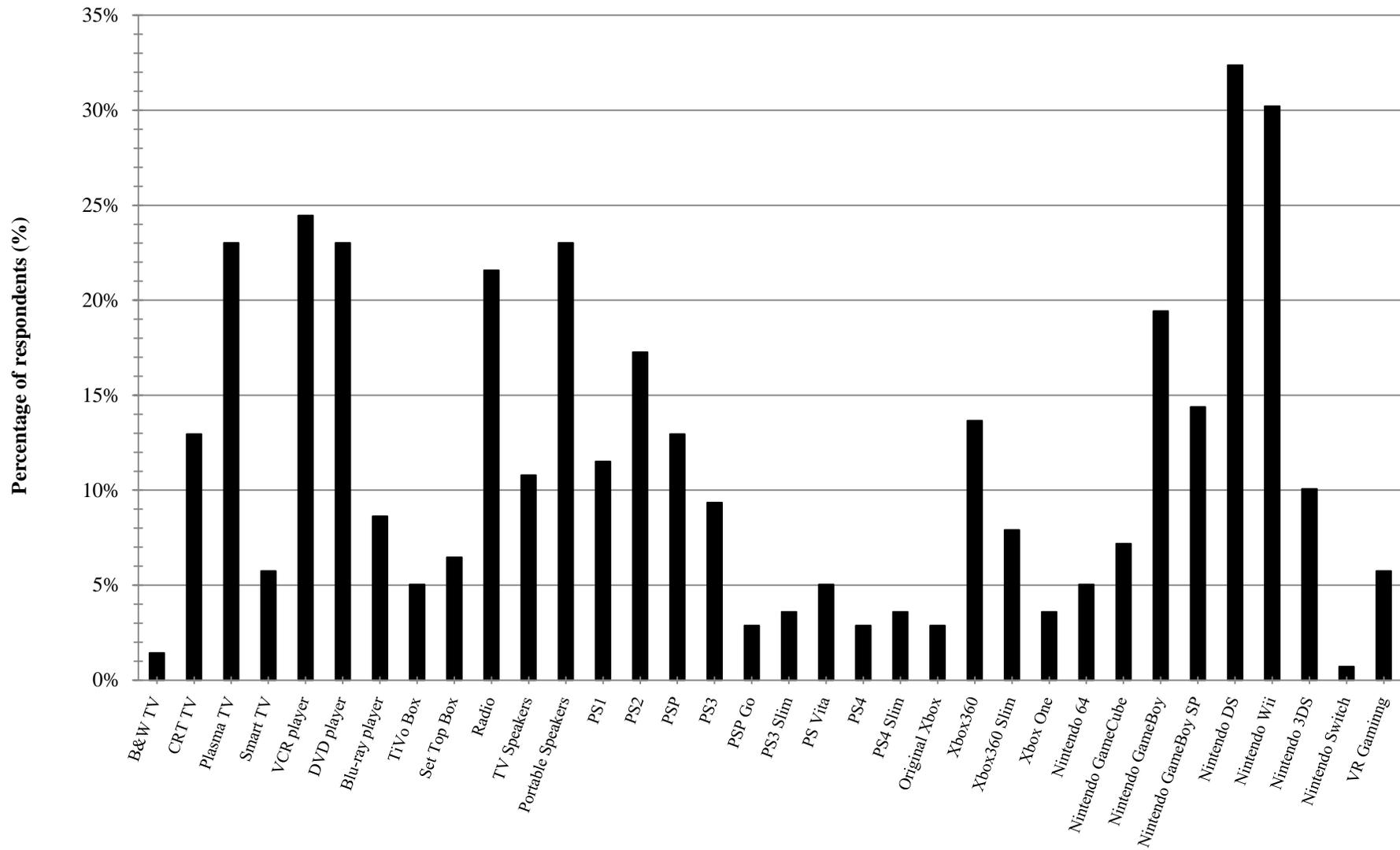
Figure 2. Complete breakdown of hoarding levels of all home entertainment electronic products within surveyed households (n=104)

Table 3. Results of Wilcoxon tests testing for significance between gifting, selling and disposing (GSD) routes

	Sell online	Give to family and friends	HWRC	CeX	General waste bin	Sell to family and friends	Recycling bin	Leave away form house	Online recycling	Leave outside house
Charities	76	29	87	103	109	95	105	116	101	113
	34	55	21	9	11	16	9	8	9	5
	28	54	30	26	18	27	24	14	29	20
	-5.048	-3.181	-6.680	-8.172	-8.747	-7.285	-8.597	-9.179	-8.564	-9.044
	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sell online		12	62	65	87	69	81	93	74	87
		89	48	15	18	22	21	8	19	11
		37	28	58	33	47	36	37	45	40
		-7.525	-1.373	-6.152	-5.866	-4.781	-4.942	-7.868	-4.903	-6.622
		0.000	0.170	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Give to family & friends			94	116	119	110	117	125	115	124
			11	3	6	4	6	7	4	6
			33	19	13	24	15	6	19	8
			-7.940	-9.396	-9.430	-8.981	-9.147	-9.729	-9.120	-9.514
			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
HWRC				65	75	61	73	88	62	78
				31	29	40	27	14	21	20
				42	34	37	38	36	55	40
				-3.850	-4.858	-2.297	-4.707	-6.483	-4.407	-5.710
				0.000	0.000	0.022	0.000	0.000	0.000	0.000
CeX					51	35	44	59	38	51
					30	50	40	17	36	27
					57	53	54	62	64	60
					-1.659	-1.871	-1.871	-4.306	-0.145	-2.604
					0.097	0.061	0.061	0.000	0.885	0.009
General waste bin						27	17	38	30	33
						60	31	11	53	30
						51	90	89	55	75
						-3.279	-1.738	-3.090	-1.730	-0.775
						0.001	0.082	0.002	0.084	0.438
Sell to family & friends							53	62	47	60
							34	12	34	28
							51	63	57	50
							-2.200	-6.082	-1.498	-4.073
							0.028	0.000	0.134	0.042
Recycling bin								53	37	41
								12	47	24
								73	54	73
								-4.233	-0.778	-2.035
								0.000	0.437	0.042
Leave away from house									17	8
									59	33
									62	97
									-4.125	-3.219
									0.000	0.001
Online recycling										48
										26
										64
										-2.580
										0.010

Series of Wilcoxon tests assessing significant differences between all gifting, selling and disposal routes, at the 0.009 level.

For each hoarding reason, the top row figures are negative ranks (times that value of column < row). The second row figures are positive ranks (times that value of column > row). The third row figures are the rank ties (times that value of column = row). The fourth row figures are the Z-scores (based on positive ranks) for each Wilcoxon test. The bottom row figures are the p-values for each test; figures of 0.000 indicate a p value <0.0005.