# MIDP Mini Study 2: Digital Product Passport Requirements

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## ABSTRACT

This report focuses on the user needs of a technology designed for interaction with a DPP. Stakeholders were identified using a tool that ensures all stakeholders across the supply chain get a voice in the direction of the project. After interviewing these stakeholders some common opinions were found on the topics of how data should be recorded and stored, how the DPP technology should interact with users and what the technology can do to become more easily implemented into product life cycles. After this, published reports on user interaction design were consulted to build solid foundations for the DPP technology in all areas and not just the ones investigated in the interviews. The requirements generated from this were then ranked to allow for prioritisation as concept design generation begins.

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| DPP | Digital Product Passport |
|-----|--------------------------|
| EU  | European Union           |

# 1 INTRODUCTION

In order to maximise the effectiveness of Digital Product Passports (DPPs), and the wider circular economy as a whole, the European Union (EU) aims to implement some form of DPP across all product groups, including electronics (European Commission, 2020). It has pushed for early implementation of them in the battery and textiles space as these are areas deemed to be most wasteful and would benefit most from a circular solution (European Parliament, 2023).

To ensure a greater adoption across all products it is important to ensure that users find the DPP easy to interact with (Lin et. Al., 2013). By making the interaction easier, more people will use the DPP and in turn more information will be input and extracted from it. This only increases the functionality as more stakeholders are interacting allowing the product to remain in its use phase for longer as well as be more effectively recycled.

Easy interaction not only improves the functionality of the DPP but also simplifies the process for users, not only increasing efficiency but also wellbeing (Bui et. Al. 2021). In the context of E-waste recycling, efficiency is a very important metric as the margins for profit are very slim (Biddle, 1993).

To ensure that the concept created will be easy to interact with, potential stakeholders in an electrical product lifecycle need to the interviewed to ascertain what they find easy to interact with and how they think a Digital Product Passport solution should be implemented. These stakeholders will be identified using a tool that ensures stakeholders are chosen from across the entire life cycle of a product (Morgane et. Al., 2018).

This report will contain stakeholder identification with a focus on product life cycle, a summary of key important points generated during interviews with these stakeholders alongside what can be inferred from them, key user interaction principles that the concept should adhere to and finally how these points apply to the project and the DPP concepts being created.

# 2 STAKEHOLDER GENERATION

For any design project it is key that stakeholders are properly identified and involved in the development of requirements (Achterkamp et. Al., 2008). Their needs typically provide the basis for many of the early decisions and constraints generated for the project. In the case of DPPs it is especially important as, due to them being a new concept, there are not examples for how designs should look and function. A tool will be used to identify stakeholders, and this is to ensure no stakeholders are missed across the product life cycle.

The tool is SCOPIS, short for Supply Chain-Oriented Process to Identify Stakeholders (Morgane et. Al., 2018). The reason this tool was chosen is a supply chain of a product matches up closely with its life cycle, shown by Figure 1. Some other less rigorous options for stakeholder identification are brainstorming, generic checklists (Mitchell et. Al., 1997) and snowball sampling (Biernacki et. Al., 1981).
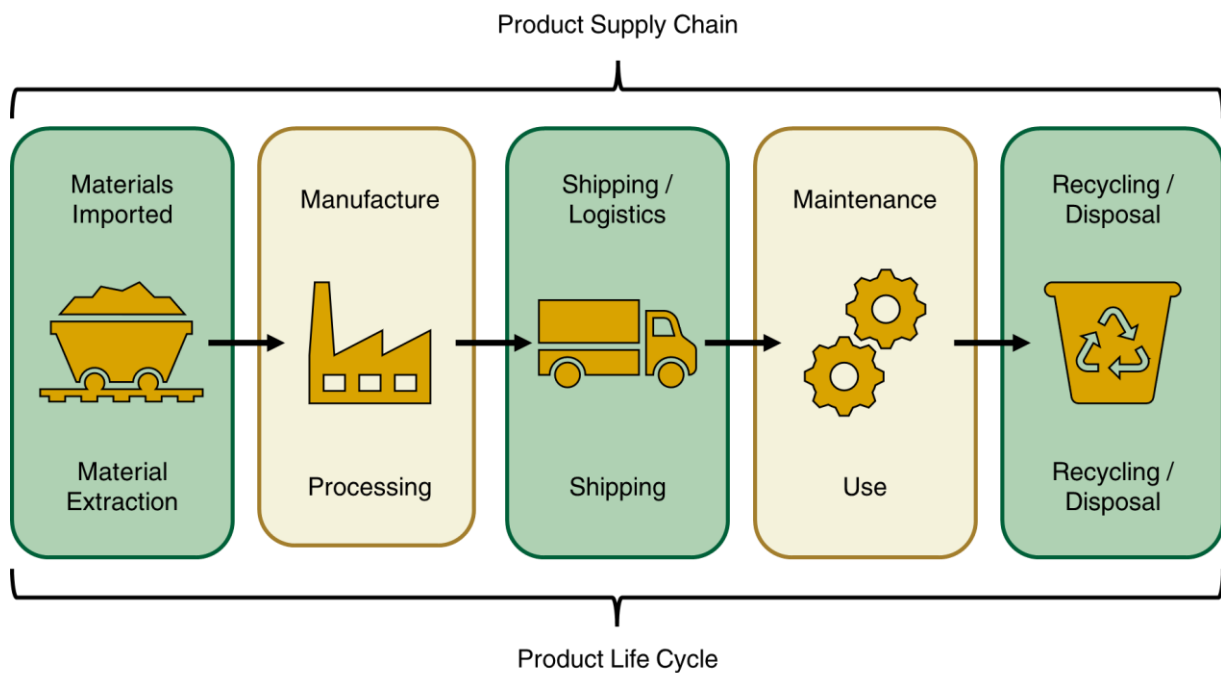
*Figure 1: A diagram of both a supply chain and a product lifecycle.*

The steps to SCOPIS can be seen in Figure 2. These steps were adapted for this project however, due to literature not existing largely for DPPs. Also, only steps 1 – 6 were followed due to the smaller scale of the project and the limited time frame. This adapted method is shown in Figure 3.
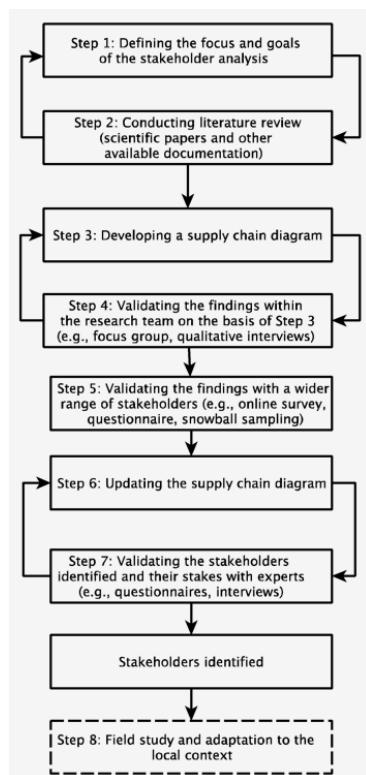


*Figure 2: Steps to the SCOPIS stakeholder identification tool (Morgane et. Al., 2018).*
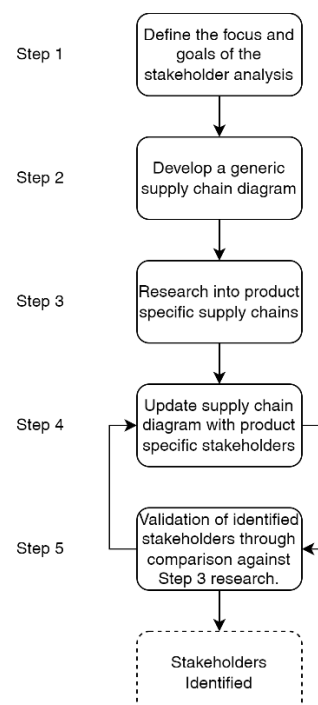


*Figure 3: Adapted stakeholder identification steps.*

As the focus for the project is on reducing E-waste a selection of varied electrical goods was chosen with the aim to identify all possible stakeholders the Electrical DPP might affect. The supply chain diagrams for these products are shown in Figures 4 to 6.
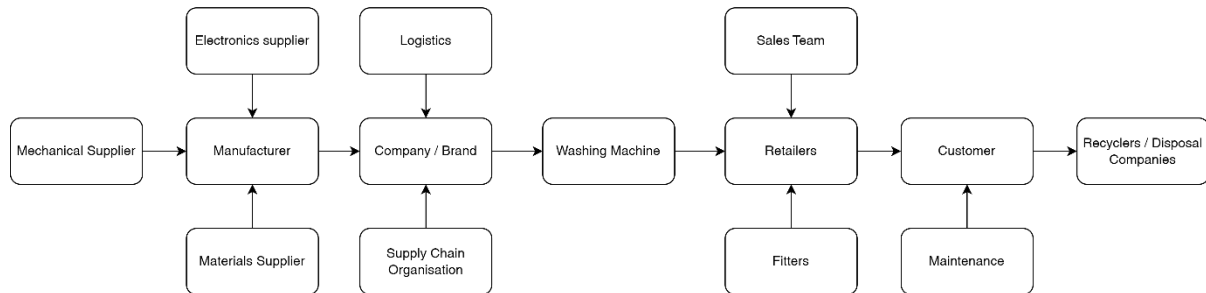


Figure 4: A supply chain diagram for a Washing Machine.
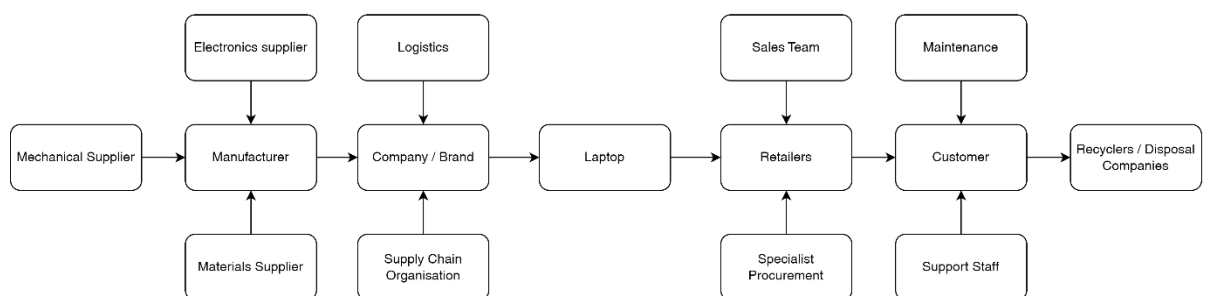


Figure 5: A supply chain diagram for a laptop.
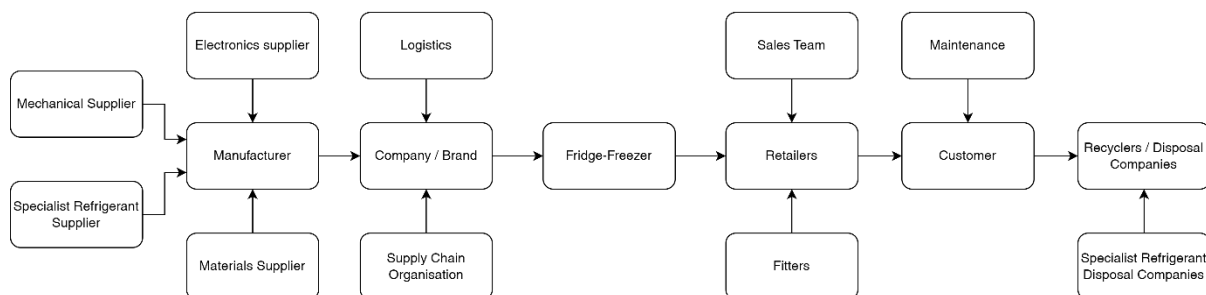


Figure 6: A supply chain diagram for a Fridge-Freezer.

The key groups of stakeholders that can be generated from these diagrams are:

- Recycling contractors and E-waste experts
- Manufacturing Engineers
- Supply Chain and Logistics Experts
- Sustainability Engineers
- Product Life Cycle and Circular Economy Experts

# 3  INTERVIEWS WITH STAKEHOLDERS

The interviews conducted were semi-structured around the following high-level points:

- What technologies and products do you find easy to use?
- What are the most important factors in implementing circular solutions?
- How do you typically collect and use experimental data?

The interviewees have been anonymised however description of their area of expertise and applicability to the project can be found in Table 1.

*Table 1: A table of interviewees and their suitability for the project.*

| Interviewee No. | Job Role / Area of Expertise | Suitability to the Project |
|---|---|---|
| 1 | PostDoc at Bath University | Very knowledgeable on sustainability, circular economy, and product life cycles |
| 2 | Graduate Mechanical Engineer | Has worked on sustainability projects within their organisation |
| 3 | Graduate Mechanical Engineer | Has worked on sustainability projects within their organisation |
| 4 | Lecture and Researcher at Bath University | Completed lots of research in sustainable energy and life cycle analysis |
| 5 | Supply Chain Engineer | Has lots of experience running and monitoring supply and production lines where tracking products is important. |
| 6 | Manufacturing Engineer | Knowledgeable on a wide variety of subjects across the manufacturing space, including End-of-Life. |
| 7 | Manufacturing Engineer | Knowledgeable on a wide variety of subjects across the manufacturing space. |
| 8 | E-Waste Compliance Manager | Works for the organisation contracted by Bath Council to assist with recycling / disposal of E-waste. |

The responses of these interviewees in the interviews can be grouped into five categories each of which will now be explored in more detail.

## 3.1 SAFETY

It is worth noting that the confidentiality and data protection aspect of DPPs is being disregarded for this project however there are still some other aspects of safety that the interviewees brought up. Firstly Interviewee 7 stated that they'd *"prefer if only [they] had access to the data,"* implying that a maintained web database would make them feel uncomfortable as there is potential for other parties to access their data. When asked if having knowledge of the handling of their data would make a difference, they said that would make them feel more comfortable but not completely at ease. Other interviewees however, stated that convenience and sustainability are more important to them than privacy so, by making the DPP easy to use and environmentally friendly, privacy problems could be overlooked.

## 3.2 DATA AND INFORMATION

When it came to how to record data, most stated that they preferred it to be collected automatically. This was because the data being automatically collected can be analysed in real-time and is usually more reliable. This is ideal in the context of DPPs as asking users of a product to manually enter data would be unrealistic and likely contribute to failure of the DPP concept. Interviewee 3, and Interviewee 6 depending on the scale of the data, however stated that they almost always manually record data.

When asking Interviewee 4 about the ways they handle data they mentioned that they typically use secondary data that has already been processed by another party. Often, they found,

where the data had been processed for use already, it became hard to interpret for their application or, during another persons' processing of the data, a mistake had been made. Interviewee 4 stated they'd *"much rather data was kept available in its raw form."*

A final point mentioned by a few interviewees was that they would want confidence in the data being accurate for them to use the DPP. This links back to the recording of data and the preference for automatic data collection due to accuracy.

## 3.3   INCREASING ADOPTION

Further factors mentioned that would affect the willingness to implement and use DPPs include the costs, ownership of data and adherence to legislations.

In terms of costs there was a big worry from Interviewee 5 and 7 that the implementation a DPP could mean a massive capital investment is required. *"Lots of smaller manufacturers and producers might struggle"* Interviewee 5 stated. This highlights the need to ensure that the DPP concept generated is one that can be retrofitted cheaply. They both mentioned that larger companies would also want to see benefits to implementing passports and not because legislation requires it.

Ownership of data was brought up by Interviewee 1 as a potential blocker to the wide implementation of DPPs. They felt it would be important to establish who has ownership and responsibility for the data on the DPP at each stage of a product's lifecycle. If this ownership was not properly addressed *"some stakeholders could get away with ignoring the DPP"* they said. Additionally, they mentioned that some in the product's lifecycle would want to know when they were in ownership so they could contribute.

A final point mentioned by Interviewee 5 was that while the DPP will become a requirement due to the legislation passed by the EU (European Commission, 2020), some companies may ignore it and pay the consequences if the implementation of DPPs were to harm their current business operations. Therefore, product life cycle analysis of electronics is needed to ensure the DPP does not affect any of the current processes in place.

## 3.4   INTERACTION

In terms of interaction with the DPP and products it has already been stated that Ease of Use is important. This is too vague to be useful for the project so responses from interviewees on what they find easy to use can aid with specificity (Blair-Early et. Al., 2008).

Firstly, two important design factors mentioned by almost every interviewee were simplicity and familiarity. Lots of the products and technologies they found easy to use were ones that have been designed to minimize the need for user inputs, for example Interviewee 7 liked the wallet functionality on their phone as it *"just requires [them] to double click a button."* Another common category of products mentioned were kitchen products as some of them have been designed to be incredibly simple, e.g., kettle and toaster, and others, such as microwaves, are almost universally designed with the same controls making them familiar. Interestingly, Interviewee 2 stated that they enjoyed the interaction and use of ChatGPT due to it feeling very familiar and *"just like talking to a friend who knows everything."*

When Interviewee 6 responded to the question on easy-to-use technologies the first statement they made was that they *"like when [they] can see what the product is doing,"* suggesting that visual feedback is an important part of interface design. This is further perpetuated in research by Li and Chen (Li and Chen, 2019). Another example they gave for improving the interaction

with a product was the use of icons throughout software programs rather than text names and descriptions.

This all suggests that the DPP concept generated should be visual based and perhaps reduce the need for too many interactions.

Ergonomics of the DPP was raised by Interviewee 5 in the context of production lines. They felt that whatever form the DPP takes, it should be easy for an engineer or technician to edit or add to the data without having to reach into or around the product.

## 3.5   GENERAL

There were several points mentioned by interviewees that didn't fit into the above groups so have been grouped here for discussion. Firstly, Interviewee 1 was curious about how a DPP would function if its product was separated. The example they gave was a steel beam being divided into two, *"would they each get a new passport?"* they asked. For the electronics scope it is unlikely that a product would be split, but it is still something worth considering since in some computer parts can be swapped in and out by the user.

Secondly, Interviewee 4 when prompted with a question on enhancing the adoption of the DPP stated that it might be beneficial to identify a subcategory of electronics that have a greater impact and contribution to the E-waste issue. This targeting of effort would mean that a bigger difference could be made in a shorter length of time. This was echoed by Interviewee 8 who stated that typically in the E-waste reuse industry, *"only the high value technologies are reused,"* with cheaper ones broken down and shredded for materials. The suggestion will be acted upon by identifying a subset of electronics to target the DPP concept for.

Finally, the last question proposed to interviewees was if they felt that there were any other industries that are just as if not more wasteful than electronics. This was an attempt to gauge the potential for a DPP in other industries. The two main responses to this question were food packaging and fashion.

# 4   GENERAL USER CENTRIC DESIGN

A key requirement for the DPP so far has been for it to be Easy-to-Use, however Blair-Early and Zender feel this does not have any meaning (Blair-Early et. Al., 2008). A term they believe is more appropriate is Easy-to-Learn as this encompasses the user's interaction with the product. Therefore, the DPP will not only need to follow the simplicity and familiarity mentioned already in section 3.4 but will also need to be Easy-to-Learn.

Some further general points for User Centric Design were investigated to ensure the DPP concept will not only be functional but also be user friendly. Ruiz, Serral and Snoeck developed a list of 36 core principles for Functional User Interaction Design (Ruiz et. Al., 2020), of which the most relevant will be explored.

Firstly, A few of the most popular of the core principles have already been identified within this report, suggesting that the interviews carried out have been successful.

One of the top core principles Ruiz et. Al. propose is striving for consistency. This is important to the DPP application as, with many varying products being subject to the regulations, the passport must take many forms. Therefore, a similar interaction should take place in all DPP use cases.

Preventing Errors is another core principle, however, is quite broad. In the context of DPP it could suggest that there should be preventative measures in place to reduce the chances of incorrect data being input to the DPP. A method for this would be to give the DPP a unique signature. This will be considered in the final concept.

Finally, the most important and useful to new users, Help and Documentation (Nielsen, 1994). As the DPP is a very new idea proposed by the EU there are few people that understand it. While this is likely to improve, in its early stages of implementation it would be beneficial for products to provide support documentation so that the users understand DPPs as well as provide proper training to all professional stakeholders interacting with one.

# 5   APPLICATION TO PROJECT

In previous sections, lots of interesting design principles and user requirements have been explored and some applications to the DPP have been mentioned, however, a cohesive discussion will now take place on what has been identified and how it applies to the conveyance of a DPP.

It is clear from the interviews that simplicity and familiarity are very important aspects of the design that should be considered. Therefore, areas of the design where the user interacts with the DPP need to be tested iterated to reduce the need for interaction while keeping functionality. This furthers the tendency to an automated concept, a choice that agrees with interviewees opinion on recording data. By keeping the concept simple it can then be transferred easily across different product groups allowing for a consistent method of interaction.

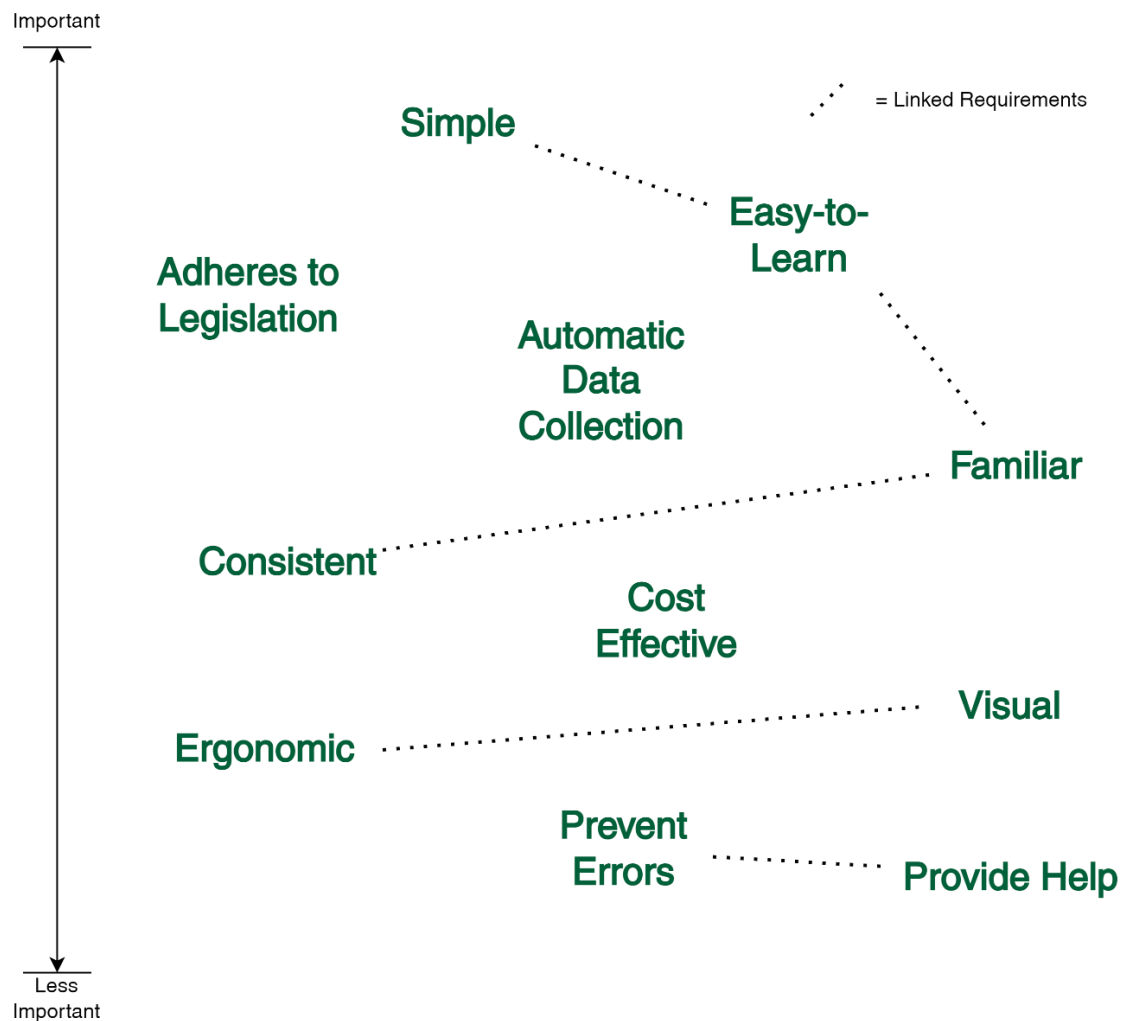The requirements and constraints have been ranked in Figure 7.

Figure 7: A ranking of requirement importance as well as the links that can be made between requirements.

## 6  CONCLUSION

In conclusion, interviewing stakeholders from all areas of the product life cycle proved very beneficial in identifying the important requirements the DPP concept will need to meet. Part of the reason this was successful is likely due to the generation of effective stakeholders in the first part of the report. By bringing all interviewee responses together it was possible to decide on some of the key design requirements for the DPP such as simplicity, familiarity, and ease of learning. These requirements can now be used to start a concept ideation phase where many ideas can be created with the goal of determining the direction for the project along with what technologies need to be incorporated. The requirements generated in this report as well as the previous one will assist with the generation of concept ideas and the creation of a formal design specification for the project that can be referred to when necessary.

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# 8 APPENDICES

## 8.1 APPENDIX A – INTERVIEWEE 1 TRANSCRIPT

Interviewer: So in terms of a circular economy and implementing these digital product passports as part of a certain assist with circular economy, what a sort of key factors do you think that would aid the implementation?

Interviewee: So I think depending on how it's implemented, you might need to consider things like if the say you're making a steel beam, you're steel manufacturer if that steel beam then split after its first use and it goes to two different people, how can you guarantee which one it's getting the passport and it should both get them so things like that. So multi use and multi user recycling.

Interviewer: You can either manually record data or automatically have a system where it gets inputted. Is there one you prefer?

Interviewee: So in my line of work, definitely automatic data collection would be a huge benefit cause trying to rely on people to take the data can often be tricky and to try and tell them which data I need that was all being automated. It would definitely expedite my work anyway.

Interviewer: Recycling the materials at the end would help, but are there any other ways in which you think E waste could be reduced?

Interviewee: Umm, I guess instead of recycling for if we're in the same definition here, we're like pulling apart and then taking out the materials, reusing them again, more reuse where things get a second life without necessarily having energy put into them to transform it.

Interviewer: Are there any other products you consider that to be as wasteful or more wasteful?

Interviewee: I guess things like single use plastics and food or one of the biggest wasteful ones as well. That's when you get things like meat in those rigid plastic ones that are not the easiest thing to recycle.

Interviewer: Have there been any technologies that you've started using or products that you've started using that you've found really easy to pick up and get to grips with?

Interviewee: I I guess nondigital things which will be the answer since something like a book, it's like straightforward as linear to use for his. I guess even if you have something like wireless headphones, you still go to connect that to your Bluetooth device, which isn't necessarily that easy.

Interviewer: And then are there any appliances or electrical goods you use that you think have like really simple, easy to use interfaces?

Interviewee: So things like kitchen appliances like kettles, that's just one button. Yeah, and microwaves.

Interviewer: How do you feel about sort of AI and in terms of it being used as a in uh, in image recognition and potentially facial recognition, how do you feel about having all of that data sort of your face or what you're seeing being processed by an AI on a server somewhere?

Interviewee: I think when it comes to the the biometric data, it can be a bit worrying to me to imagine things like your face being scanned when you're not aware of it, like walking through the city centre. I don't have that much of an issue like my phone can use a face to unlock it. I don't mind that so much. So I guess it it's more about not knowing about being recorded or knowing about the data being collected.

Interviewer: When you go to the shops, do you use contactless, cash, insert your card or you do use your phone?

Interviewee: Almost always contactless.

## 8.2 APPENDIX B – INTERVIEWEE 2 TRANSCRIPT

Interviewer: What's your sort of experience with barcodes and QR codes?

Interviewee: I like them. Just scan it and whatever appears appears.

Interviewer: Do you have a struggle with self checkouts or finding things don't scan perfectly?

Interviewee: Yeah, sometimes. Have you ever shopped in decathlon? their self checkout is incredible you don't need to scan anything. You place it in the basket and it automatically knows what you scan. There must be a chip somewhere on the tag and there must be a chip on the tag and as soon as you put it in the basket it knows what's being scanned.

Interviewer: When you go to the shops, do you use contactless. cash, insert your card or you do use your phone?

Interviewee: Always on my phone.

Interviewer: And are there any apps you find on your phone to be sort of intuitively designed and easy to navigate, sort of easy to input an extract data and just easy to use in general?

Interviewee: Yeah, all the main ones.

Interviewer: And what about any new technologies you found easy to pick up and potentially just technologies you find easy to use?

Interviewee: I don't know if you wanna class like AI as it? ChatGPT mainly.

Interviewer: What do you think made that so easy to pick up and easy to use?

Interviewee: It takes you to the the the home page where you type whatever you want and it's like you're talking to a person, but you can be as blunt as you want, you know, I mean, it's it's it literally get what you want.

Interviewer: And on speaking about a how do you feel about AI recognition software and sort of facial recognition and that whole thing where they potentially storing during your data of your face and stuff?

Interviewee: I'm personally not against it, I think. Like, I think we just way past that being a problem like a phone is doing way more than that. It can be problematic, but that's way beyond me.

Interviewer: back when you were at uni and you were doing tests and experiments and that sort of things and what did you find the best methods for recording the data that you are producing?

Interviewee: What I did was pretty manual.

Interviewer: Did you find it a bit of a pain to have to constantly manually input things?

Interviewee: Yeah. I think automation is the way forwards. It's a lot more consistent.

Interviewer: Do you feel like there are any more polluting or wasteful sort of products and product life cycles than electronics?

Interviewee: I don't think it's more on electronics individually like let's say like we do have a lot of I like laptops for example, like in the work environment we have a lot of a lot of laptops and lot of screen that is a lot of waste, but it's not actually waste cause it's being used. Recently it's been in the news that E cigarettes aren't like that. And like food, food is, I think, probably one of the biggest wastes out there.

Interviewer: What would you consider the most important factors in sort of contributing to a circular economy?

Interviewee: Two things are that actually like to mention and I would like to say cost it cost is the biggest in any anything and legislation. But also what we're obviously you know, you did pollinate what we're finding is it's also what kind of reward you get from it, whether it's.

### 8.3 APPENDIX C – INTERVIEWEE 3 TRANSCRIPT

Interviewer: Can I just ask what your experience with sort of barcodes and QR codes is?

Interviewee: Nowadays they're very, very easy considering you can just kind of whip your phone out and scan them. You probably remember a time when you know you go to supermarket and you need one of those, like actual barcode scanners, to scan all of these things. But now you can literally without your phone and almost all phones have a QR code scanner or barcode scanner on it. They're super easy to use.

Interviewer: I'm going back to your university days, and when you're sort of doing experiments and tests and stuff in the labs, what did you find the easiest way to record data?

Interviewee: To be very honest, if I had an automatic system, it would have made life a lot easier, but I'm I think also I'm slightly biased in the sense that I'm quite old fashioned. I kind

of record almost everything in a notebook and then put it up into some of these slides form and matter of fact that I've been called out on not being, not putting it up on this last form just because I'm lazy. Usually either I'll take notes down in my notebook, or I'll take notes down on my phone, or just take photos, which then I can refer to and write up the notes later.

Interviewer: I don't know if you've ever tried it, but there's this like Google Lens app you can get which can recognize what you're looking at.

Interviewee: Yeah, it's super super easy.

Interviewer: How do you feel in terms of the privacy around it being able to see what you're doing in your everyday life?

Interviewee: So it's not something that I try to go to like major lengths to try and mitigate, it's something that I'm aware of and I and I know that people are probably collecting data Google for probably the government or like whatever Facebook like all these marketing things and ads and stuff that you see, they're obviously collected data from these platforms that I'm on. I think it's we're in a day and age where it's exceptionally hard to avoid it at all costs. Like I could go to great lengths and a lot of effort to reduce like 80% of the spyware or like or kind of keeping an eye on me type of stuff but then how much of that is going to actually affect my life and affect my productivity and other areas and also the mental stress of it.

Interviewer: And then on to some sort of interaction questions, are there any technologies or products you've recently picked up that you found really easy to sort of get to grips with and start using?

Interviewee: To be very honest, probably Google lens like it was the only very recently that I started using it. I would probably say that Google lens is probably the easiest thing for me to pick up and I was just kind of shocked at how quickly it can identify things.

Interviewer: Would you reckon the reason you've sort of picked it up and you've found it so easy to sort of introduce into your life is just down to how functional it is and how easy to use it is?

Interviewee: Yeah, It's genuinely the closest thing I can think of to a point and click camera and it works better because like a point and click camera like a disposable 1, if you know what I'm talking about like you just point and click, you don't have to focus anything. I would say it's functionality and the user friendliness of it is like it's made for idiots. It's like the greatest kind of operation method that I can think of is if I was to make something, I would want every single person using it to be able to use it exactly the same way and receive the same results.

Interviewer: Are there any apps on your phone that you find to be intuitively designed?

Interviewee: I would actually say Google Wallet is pretty good because you can add stuff to it quite easily. When you open it, you're not overwhelmed with like a bunch of buttons and lots of options that you can click on and stuff. I can see like a I've got any tickets that I've got any like club cards that I've added I can add to my wallet and then all I've got is just my kind of profile thing at the top which I can set my set my settings. It's not something that's brand new to me. Is a again going back to Google Lens is I'm not overwhelmed with a massive amount of options as what to I can do the use of the app is very simplistic which is what makes it great.

Interviewer: And then sort of off the back of the wallet thing, when you go to the shop, do you tend to use your phone to pay?

Interviewee: Phone, I've kind of really reduced carrying around my cards and my wallet as much as I can.

## 8.4 APPENDIX D – INTERVIEWEE 5 TRANSCRIPT

Interviewer: So I just want to run through some existing supply chain technologies and I was just wondering, are there any technologies within sort of production lines and supply chains that you're aware of that are very good or bad checking sort of the information and tracking the product?

Interviewee: Uh, RFID is a big one and that's used everywhere. It's pretty good to use. it does run into limitations about what you can and can't use it on. And if you go particularly metallic product, you're gonna struggle.

And barcodes are a big one but like you can't really update the barcode, so there's just more functionality in RFID.

Interviewer: When you been doing sort of experiments and labs as part of university, how have you found the best methods for recording and data has been as you've been going?

Interviewee: It depends on the data. You sort of need to have it automated usually.

Interviewer: What do you think the most sort of important factors are in enabling the circular economy?

Interviewee: I mean, you're gonna run into issues with and actually getting sort of used at the end like making the customers aware that that's a thing that they need to be paying attention to. Making it easy for us to use because the amount of times people will optimize their own work like humans will optimize their own work and then not do things in the way you want them to do. Simple implementation to already existing systems is important as well.

Interviewer: And then are there any technologies you've sort of come across that you've found really easy to sort of pick up and bring into being a part of your life in terms of using it daily or that sort of thing?

Interviewee: Wireless headphones have been like they big one. It's so much easier than managing cable.

Interviewer: Are there any appliances and products you use at home or you know again, wherever that you find have a quite a simple user interface in terms of they're easy to interact with?

Interviewee: Washing machines and dryers are pretty good in that regard. Yeah, like lots of kitchen appliances, like ovens and stuff.

Interviewer: Are there any apps that you find particularly easy to use or particularly hard to use?

Interviewee: Yeah, like a lot of the bigger ones, like Instagram and so on their own like where user friendly. all the ones that are simpler as well like I've got one here that's whole purpose is like a chess clock. That's pretty easy to use because it's there's nothing to it.

Interviewer: And then sort of going off somewhat of a tangent, when you go to the shops, do you use contactless cache, insert your card or use your phone?

Interviewee: Contactless slash phone.

Interviewer: How do you feel about umm not necessarily how big AI's becoming, but more specifically AI recognition software and a company that has a big AI model processing essentially your face or what you're seeing?

Interviewee: I'm not particularly fond of that. I don't like people being one of the data points

## 8.5 APPENDIX E – INTERVIEWEE 8 TRANSCRIPT

Interviewer: How does the WEEE regulations affect what you do?

Interviewee: So what I work for a compliance scheme and essentially it means that we have Members who are producers, producers, electronics and it's all on the producer pays principle. There's a few kind of things that there's packaging and there's batteries which are very similar, but to simplify it, they these manufacturers tell their compliance scheme, the tonnage of material they put on the market in the in a different week categories. And then we have to go out and recycle a percentage of that.

Interviewer: How much of a product can you typically recycle?

Interviewee: Well, it's not a straightforward calculation like just 40% or something, but cause every stream has got a different target, but essentially it will say look a very rough example is like oh you, Mr TV manufacturer, you've produced 100 tons of TV's. Then they have to go out with your funding and recycle, say, 40 tons of TV's on your behalf. So refrigeration, TV and whatnot, that generates an obligation for them to recycle, which we go and do on their behalf, normally from Council contracts.

Interviewer: How quickly do you typically adapt to legislation?

Interviewee: If a new regulation comes in, we must be there immediately, because if it's the law, it's the law. You get to hear about it in advance. There's no, but there's no real rule for it as far as I'm aware. You tell them the law and say the law's coming in this year and you've got all the time until that law comes in.

Interviewer: Is it a struggle to gear up for new regulations?

Interviewee: There hasn't really been much of a change in the wee regulations for a long time really, so it's hard to say.

Interviewer: And for a product supporting a circular economy, what are important factors?

Interviewee: Easy battery removal, software support, components replacement, and adhering to regulations.

Interviewer: Apart from electronics and E waste, are there any other umm, so quite wasteful slash polluting products that you think are on the same level slash above?

Interviewee: Vapes, yeah they're horrendous at the moment. Single use packaging, you know the packaging on the go and coffee cups, stuff like that.

Interviewer: Do you know how currently recyclers are tracking products?

Interviewee: Typically we find that often barcodes are used to track products through all the tests they do and to log results. I'd say you're tracking thing is really only kind of there for high value IT equipment. Because of the stuff like toasters is just it gets shredded and there's I can't see that ever changing because it's it's not worth someone's uh time.