

AIR (Augmented Intelligent Reality) and packaging:

Designing for socially sustainable practices

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Abstract

The increasing consumer demand for socially responsible products has driven companies to disclose their Environmental, Social, and Governmental (ESG) practices. In turn, the high interactivity and connectivity of Augmented Reality (AR) and Artificial Intelligence (AI) technologies have the potential to contribute to better visibility of the ESG practices. The purpose of my thesis is to explore Augmented Intelligent Reality (AIR)—a combination of AR and AI—and packaging design to create engaging visual interactions. The goal of my research is to understand how AIR packaging, combined with brand transparency and brand personality strategies, can promote socially responsible products, ideas, and behaviours. My thesis/project employs two main methods, research through design (visual experimentation) and qualitative research (expert interviews and focus groups).

Findings from qualitative research served to guide an in-depth critique of the visual production and gather new design insights for further design explorations. My thesis implies that AIR packaging can perform as a powerful vehicle to provide two-way communications between consumers and companies. By helping companies offer more brand transparency to consumers about their supply chains, it can achieve positive outcomes for brands, creators, and society. Moreover, AIR packaging can be seen as an educational tool to inform consumers about the production process and make them aware of the environmental and social impact of the products they consume.

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Introduction

Consumers are increasingly aware of the environmental damage caused by the human footprint. In turn, Consumer Packaged Goods (CPG) companies are responding to consumer's demand for more transparency, especially regarding social and ecological sustainability (Kraft et al., 2018). Brand transparency requires companies to address Environmental, Social, and Governance (ESG) practices throughout their supply chains to make their businesses more transparent to themselves and the public. Yoo (2014) defines *brand transparency* as "consumers' perceived levels of a brand's strategic communication effort to make information available - whether positive or negative in nature - for the purpose of enhancing their understanding and making a brand accountable for marketing practices" (p. 11). This definition is essential for the progress of this thesis because it anchors consumers' participation and understanding to the core of transparency conceptualization. However, as globalized companies have increasingly complex and diversified supply chains, it is often challenging for consumers to know the true origins of the products they consume. As such, a critical question arises for the development of ESG practices of a business—how could the communication between consumers and companies be more effective, direct, informative and memorable?

One of the easiest ways for a CPG company to convey product information and brand values is through packaging. Many researchers have seen the packaging as the primary vehicle for communication between the brands and prospective consumers (Pal et al., 2018; Rettie & Brewer, 2000). However, the limited space of the package—especially in the food category—leads to a competition where distinct types of information try to claim territory from each other. Food packages are circumscribed by regulations, logistic demands and commercial conventions (Wagner, 2015). Consequently, brands find ways to expand their packaging by using

excessive materials, which not only increases the cost of production but also creates more waste. The shelf space—where products are viewed in multiples—is continuously becoming a contested place. Companies dispute for the territory to spread their message and attract the consumer's restless eyes. In parallel to this, developments in technology are changing the way people interact with products and packaging.

The visual language for packaging is, in turn, evolving with the use of technology. We have witnessed the use of Augmented Reality (AR) technologies in retail to enhance human-artifact interaction, optimize communication and reinforce brand engagement (Scholz & Smith, 2016). In the same way, Artificial Intelligence (AI) is transforming the future of marketing strategies and customer behaviours (Davenport et al., 2020). For the progress of this research, I am proposing the combination of both technologies, AR and AI, to create the concept of Augmented Intelligent Reality (AIR). This investigation aims to explore possible scenarios in which AIR technology is used to improve the communicational aspects of packaging. This thesis raises the question—how could AIR (Augmented Intelligent Reality) be designed with packaging to promote socially responsible products, ideas and behaviours? By exploring the possible uses of AIR packaging, this research strives to promote socially sustainable practices among consumers and also inside companies. Specifically, I bring a visual demonstration of how CPG companies could virtually explore AIR packaging as a communication tool. The design proposal simulates scenarios where technologies are used to allow two-way conversation between consumers and products. Further, I conduct a series of interviews and focus groups with experts from CPG industry and an academic expert, to evaluate the business and societal implications of the design concept if adopted by companies.

This thesis starts with the theoretical framework description. A research gap is presented by investigating AI and AR technologies' potentials when combined with marketing strategies, such as brand transparency and brand personality. Then, I outline the structure of the methodologies and analysis techniques used in this study. After that, I explain the creative process of my first visual exploration, followed by the analysis and discussion of the qualitative research findings. As a response to those findings, I created a second design outcome to reflect the insights gathered and expand the understanding of the AIR concept. Finally, this thesis concludes by highlighting all the implications, opportunities, and limitations encountered through the exploratory process.

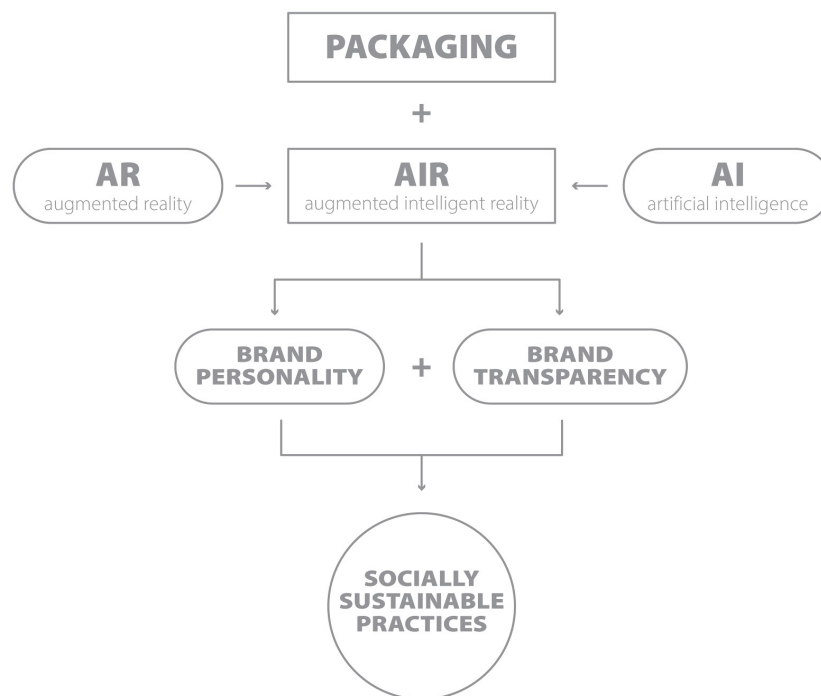


Figure 1: *theoretical framework.*

Theoretical Framework

As presented in Figure 1, the theoretical background for the conducted research comprises diverse fields of study. This thesis starts from the baseline that packaging plays an essential role as a communication medium that connects companies to consumers. Subsequently, theoretical foundations were introduced and reviewed to understand how AR and AI technologies, in combination with marketing strategies, can be effectively used to convey socially sustainable practices through packaging design.

Designing for Socially Sustainable Practices

In the last decades, the increasing consciousness about sustainability—especially environmental issues related to climate change—has driven Consumer Packaged Goods (CPG) companies to disclose their Environmental, Social, and Governmental (ESG) practices. Researchers have found a relationship between ESG disclosure level and brand value, implying that enhanced transparency and improved stakeholder trust play an important role in increasing profits (Li, Gong, Zhang & Koh, 2018). Results from Pomeroy and Dolnicar (2009) revealed that consumer attitudes and purchase intentions are positively influenced by the values and ethics of socially responsible firms—but only if consumers are aware of them. Consequently, marketers and designers are increasingly deploying prosocial and green marketing communications to create this awareness and convey any additional information that can potentially impact business performance. The problem is that this sort of one-way communication delivers just what benefits the brand, and consumers are increasingly aware of the manipulative use of sustainable marketing. Therefore, their effectiveness is still uncertain as consumers are often skeptical about such campaigns (Pomeroy & Dolnicar, 2009). Mostly because of the wide variety of potentially corporate disinformation and dishonest communication that falls under the umbrella of

greenwashing. In other words, greenwashing concerns disparities between organizations' green claims and their actual environmental performance, which fosters ESG skepticism (De Jong et al., 2020). Various studies on the consequences of greenwashing on consumers show that greenwashing, when discovered, harms consumers' attitudes and behavioural intentions toward the brand or organization (De Jong et al., 2020). Research results reveal that greenwashing is a widespread phenomenon, and "the best way to help consumers and companies that are trying to be more environmentally friendly is by increasing transparency and education for consumers" (Polignano, 2019, p. 60). Definitely, greater transparency would be essential not just to meet corporate sustainability goals but also to solve the lack of knowledge of consumers, fostering the adoption of socially responsible consumption. But, considering it is possible to enhance communication of the EGS practices, could design help people engage more actively as citizen-consumers? And if so, how?

Design practice has an inherent social role, and according to Heller and Vienne (2003), it should be anchored in the very reality of its social consequences. However, to understand these consequences, it is necessary to comprehend how messages function for the readers, who bring their own expectations and interpretive practices to the exchange (Heller & Vienne, 2003). Dunne and Raby (2013) argue that design can be used to "raise awareness of the consequences of our actions as citizen-consumers" (p. 38), helping people become more discerning consumers and encouraging them to ask more from companies as critical-consumers. In our consumer society, design is often seen as a strategic practice that helps companies increase profits. According to Fry (2009), the current challenge is to invert this history and make products that functionally contribute to a sustainable way of living. He further states that "this cannot be merely more niche-marketed 'green products'... Rather, the imperative is to create 'products that

self-sustain' (themselves and/or via their users) and in so doing, contribute to sustaining ability in general" (Fry, 2009, p. 86).

This notion of design in assistance of sustainable development has been around for a long time. In 1985, Victor Papanek claimed that "design, if it is to be ecologically responsible and socially responsive, must be revolutionary and radical in the truest sense ... In many areas, designers must learn how to redesign. In this way we may yet have survival through design" (pp. 346–347). Being radical and revolutionary requires designers to use their imagination to speculate ideas. Speculative design, described as "creating an idea of possible futures" (Dunne & Raby, 2013, p. 2), is seen as a way to escape from restrictions and reflect on opportunities openly and freely. As suggested by Tharp and Tharp (2019), designers should be working within an *opportunity space* rather than a *problem space*. It means using social-centred approaches rather than user-centred to augment the understanding and serving (Tharp & Tharp, 2019). One of the most effective forms of creating speculations is by raising the question "What if?" in the broadest and projective sense (Tharp & Tharp, 2019; Dunne & Raby, 2013). With the capability of design to create scenarios, it is possible to question, stimulate and inspire social dreaming.

The Role of Technology Plays in Our Social Spaces

Technology plays an essential role in the economic and social change of human societies. According to Hickman (as cited in Coccia, 2019), technology can be perceived as "the intelligent production of new tools, including conceptual and ideational ones, for dealing with problematic situations" (pp. 2-3). In the book *Design Futuring*, Tony Fry (2009) argues that the way products and systems of human creation act on our social spaces have become decisive of our very existence as species. In this sense, it is impossible to avoid technology in our lives today since "we do not just live with technology but by it" (Fry, 2009, p. 35). Thus, every future vision of

products in our daily lives must be technologically affected. Definitely, technology has the power to change current forms of perception and behaviour, which allow companies, designers or users to take advantage of opportunities or deal with problems. In our economic model, technologies penetrate all business segments, altering their strategic systems, tasks and tools. Some slight shifts can have a massive impact on the way that we know retail today. For instance, decades ago, barcoding in packages as an identifying system opened up a wide range of possibilities for trade enterprises. In modern retail, the high connectivity and interactivity frequently modify the way consumers engage in the shopping process (Caboni & Hagberg, 2019).

Conversational Artificial Intelligence (AI)

Artificial Intelligence (AI) is transforming the future of marketing strategies and customer behaviours (Davenport et al., 2020). The majority of general consumers believe that AI will make society better, whether helping solve complex problems that plague modern societies or helping people live more fulfilling lives (Cannella, 2018). In fact, there are countless ways in which AI can contribute to business and society as a whole. For instance, conversational AI—technologies that users can talk to, like chatbots or voice assistants—can respond instantly, providing 24-hour availability to potential customers and allowing them to engage more quickly and frequently with brands (IBM Cloud Education, 2020). Millions of people are already using conversational AI in their daily lives, such as Siri by Apple, Amazon Alexa, Google Home, and Microsoft Cortana. Therefore, voice-enabled interactions are increasingly becoming a prominent tool for brands to integrate into their communication efforts. At this point, having an intelligent technology able to talk with customers in a human-like manner opens up many opportunities for packaging design. It would allow consumers to drive frictionless experiences at their own pace and engage with brands much more natural to human cognition (Cannella, 2018).

Augmented Reality (AR)

In recent years, Augmented Reality (AR) technologies have been increasingly used in retail to enhance human-artifact interaction, optimize communication and reinforce brand engagement (Scholz & Smith, 2016). AR is the practice of augmenting a real-time direct or indirect view of the physical world by displaying virtual layers of information (Carmigniani et al., 2011). Consequently, AR packaging has become an excellent tool for storytelling on products due to its capability to merge the digital and physical environments. The Australian wine brand 19 Crimes is a fantastic example of adult-targeted AR packaging for storytelling (see Appendix A). In 2017, the company launched an AR application that allowed consumers to experience animated labels, which prompt characters to give monologues to tell each bottle's story. By encapsulating a piece of the story of Australian colonization, it engages consumers on an emotional and rational level. The positive buzz provided by this study case reveals how consumers like to engage with AR-enabled labels (Stone, 2017). This thesis, in turn, seeks to expand the AR interaction by adding a new layer of technology—specifically, conversational AI—that would not just allow the package to tell a story but also listen to what the user says and respond through synthesized voices. At this point, storytelling on product packaging could be even further explored as a strategy to raise consumer awareness of socially sustainable practices rather than just selling products.

Augmented Intelligent Reality (AIR) Packaging

While AR packaging can play a relevant role in combined marketing strategies, little is known about the use of AR in combination with conversational AI. This thesis speculates on this gap in the literature by coining the term Augmented Intelligent Reality (AIR). Therefore, AIR packaging represents a theoretically novel concept with the potential to improve the

communicational aspects of products. By blending the real and virtual worlds, AR technology serves as a bridge to implement conversational AI on packages, opening up a wide range of possibilities for communication strategies. With the use of AIR packaging, innovative marketers and designers can provide immersive brand experiences while engaging customers with personalized and easy conversation through virtual assistants. As customer engagement grows, companies will see its impact reflected in increased customer interest in learning more about ESG practices throughout their supply chains. In turn, AIR packaging combined with marketing strategies—such as brand personality and brand transparency—could be a powerful communication channel for organizations, improving consumer experiences and building trust, affect, and consequently loyalty. Accordingly, it can be useful to solve the consumer skepticism (mentioned earlier) about firms' ESG performance and practice.

Brand Personality and Brand Transparency

In combination with AIR packaging, this thesis explores two main marketing strategies: brand personality and brand transparency. The aim is to reinforce the communicational aspects of AIR packaging while promoting socially responsible products, ideas and behaviours more efficiently. In consumer behaviour research, brand personality—a set of human characteristics associated with a brand—is seen as a marketing strategy that can increase consumer preference and usage, evoke emotions in consumers, and build trust and loyalty (Aaker, 1997). Anthropomorphism—a type of personification—is a well-known technique used by CPG companies to assign human-like visual characteristics to products, like designing brand mascots in packaging. Findings in the literature revealed that anthropomorphic packaging could be more than just a marketing technique as it can trigger social connections in products. According to Rauschnabel and Ahuvia (as cited in Gameiro, 2017), brands are more appealing to consumers

when seen as human beings, leading them to create a stronger relationship with brands. Moreover, once consumers can perceive anthropomorphized products using the same cerebral process as they use to comprehend human beings, studies in psychology show that "anthropomorphizing non-human entities prompts people to treat them as moral agents worthy of respect and empathy" (Wen Wan et al., 2017, p. 1010). In this scenario, using brand personification for social causes boosts people's willingness to comply with prosocial communication by building guilty feelings related to the social causes (Wen Wan et al., 2017).

Similarly, research reveals that brand transparency plays an essential role in increasing socially responsible practices. Transparency serves as a foundational tool for reducing consumer skepticism and distrust within commercial realities in which people have become increasingly vigilant against organizations (Parris et al., 2016). Tapscott and Ticoll (as cited in van Donk et al., 2010) claimed that, in the new technology age, companies would no longer be able to hide from their customers. Social media, in particular, has served as a vehicle for exposing companies that engage with socially incorrect practices. Therefore, transparency has been touted as the ideal solution to create a sense of trustworthiness, benefiting an organization's employees, customers, and partners, as well as entire societies (Parris et al., 2016). Interestingly, prior research has shown that brands associated with such personality characteristics as sincere, honest, credible, and reliable can be used as a fundamental driver in enhancing persuasion and increasing brand trust and affect (Sung & Kim, 2010).

Methodology

The methodologies in this thesis comprise two main parts: research through design (visual experimentation) and qualitative research (expert interviews and focus groups). As shown in Figure 2, the methodological framework works as a cyclical process. Driven by findings in the

literature review, the design investigation seeks to create conceptual products by raising the question "What if?." As described in the previous sections, by raising multiple "What if?" questions about the future, it is possible to think about how products could (or perhaps, ought) to be. By speculating ideas through fictitious scenarios, designers imagine more tangible and realistic experiences of the desirable future. This thesis aims to produce fictional products, "where design is proactive rather than reactive and the designer asks, 'What if?' in the most open and projective sense" (Tharp & Tharp, 2019, p. 37). In parallel to the exploratory production, the qualitative data collection and analysis provide data to conduct an in-depth critique of the visual output to find connections and gaps in the proposal, gathering new design insights for further explorations. In the following, I describe and explain the structure and process of my research methods.

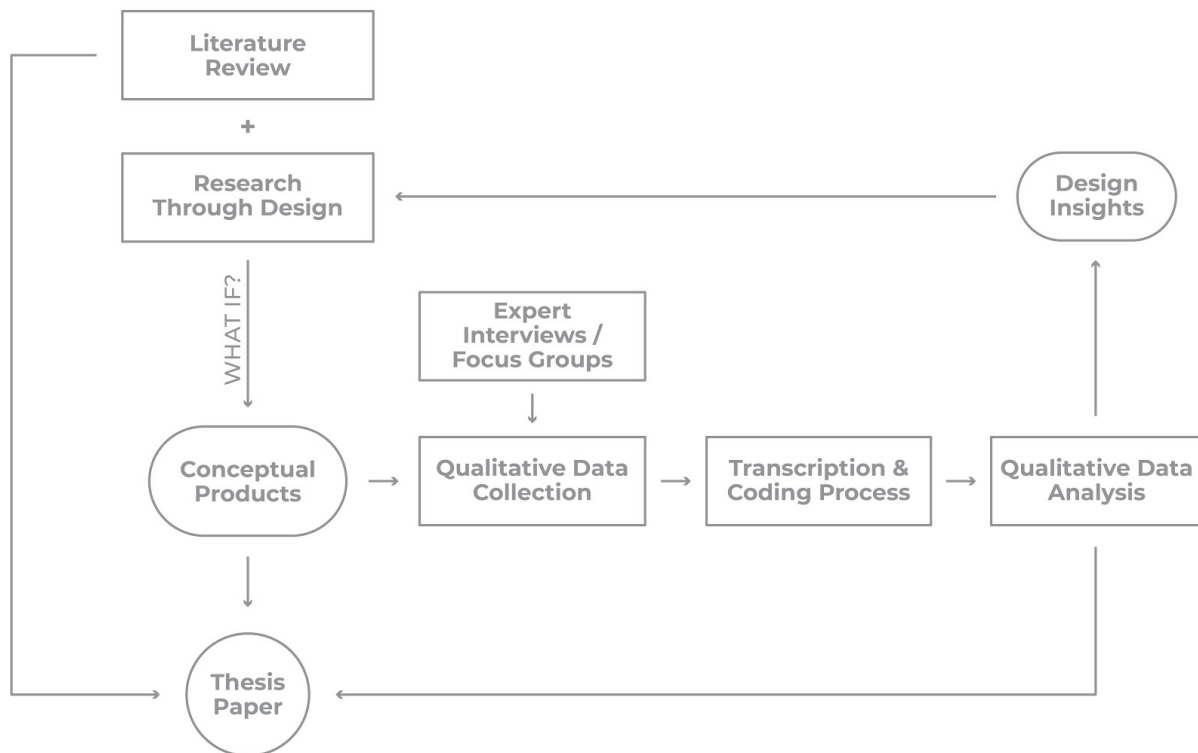


Figure 2: research methodology framework.

Research Through Design (RTD)

Research through design (RTD) understands the design process as a genuine research method. RTD works bridging theory and building knowledge to enhance design practices by examining the tools and techniques of design thinking and making within the design project (Martin & Hanington, 2012). This exploratory practice is very similar, in appearance, to a regular design project. However, the primary purpose of RTD is the knowledge and understanding provided through the progression, instead of the final artifact (Godin & Zahedi, 2014). Therefore, the process documentation is a crucial concern for the development of this research.

Through the process of speculation, imagination, experimentation, and critique, I produced a body of work to guide this study. The outcome resulting from the visual exploration worked as prototypes to experiment with ideas, test hypotheses, and pose new questions. The documentation that emerged from this design process, including sketches, drawings, digital and physical mockups, and videos-simulations, is as significant as the artifact, contextualizing and communicating design action. To expand the knowledge acquired during this creative practice, it was necessary to critically reflect the body of work produced. Thus, exploratory expert interviews and focus groups were chosen as a method for qualitative data collection.

Qualitative Data Collection

As a qualitative empirical research method, the expert interview aims to explore or collect data about a specific field of interest. According to Meuser and Nagel (as cited in Döringer, 2020), experts can be defined as "persons responsible for developing, implementing, or controlling a solution or persons who have privileged access to decision-making processes" (p. 3). In other words, experts are recognized as knowledgeable of a singular topic and are distinguished under their specific expertise, position, or status. For this study, I selected eight

experts embracing the following areas of interest: marketing, design, product innovation, and philosophy of moral/social cognition.

The expert interviews of my study took place in both individual interviews and group settings—called focus groups. Involving two or more participants can provide more natural conversation and are often compelling, with interviewees reminding or challenging each other about specific topics (Martin & Hanington, 2012). To ensure a more prosperous and open discussion about my design proposal, I opted for using pre-formulated and open-ended questions at the beginning plus follow-up questions, which allowed me to introduce thematic aspects in the interview course in a flexible way (Döringer, 2020). My decision was supported in Qu and Dumay's (2011) writings, who point out semi-structured interviews as the most effective and beneficial means of gathering information. To complement the series of questions (see Appendix B) that guided the conversation, I used a video-simulation (see Appendix C) as a prototype to elicit more detailed responses. Thus, the focus of the discussion was guided by themes explored in my initial design investigation. Using this particular type of structure, which has its basis in human conversation (Qu & Dumay, 2011), allowed me to modify the form, pace, and ordering of questions to extract the participants' fullest responses.

Due to the contact restrictions caused by COVID-19, the interviews were conducted entirely electronically with video chats. The sessions were audio-recorded with the participant's approval, obtained through an informed consent form sent via email before the meetings. In the document, the interviewees were asked if they would like to keep their names (and company name) anonymized during this study. Of course, for those who wanted to have their answers quoted with names and positions, there was the option to waive anonymity. The audio-recordings and subsequent transcriptions attended the only purpose of ensuring accuracy and avoiding

missing any relevant information provided by the participants. After the interview, the consent form, recording and transcript files were safely kept in a password-protected folder.

A theoretical sampling strategy was chosen for the expert interviews as it is often appropriate for exploratory and qualitative research (Coyne, 1997). Theoretical sampling comprises selecting participants based on specific characteristics. As previously mentioned, my study sought professionals in the following areas of interest: marketing, design, product innovation, and philosophy of moral/social cognition. Even though there were no face-to-face meetings, the participants' list was limited by a geographical area. All of them work for Toronto-based companies or institutions. The contacting and invitations happened through the social network LinkedIn as well as personal connection recommendations. Initially, I considered a theoretical sample of five interview candidates as the first direction for individual data collection. Then, the snowball sampling technique was used to expand the number of experts in the qualitative research. Two of the participants invited some of their co-workers who are more engaged with augmented reality packaging. It allowed me to extend the data collection from five individual interviews to three individualized and two focus groups, adding up to eight experts. It was a crucial process to an in-depth understanding of the topic because it provided more diversity and enrichment to the exploratory discussion. As some participants did not waive anonymity, I decided to identify all of them by acronyms (see Appendix D) to facilitate the discussion in the *Findings* section. The position and business segment in which the experts operate identify their professional background. For those who waived anonymity, the company/institution name is revealed.

Qualitative Data Analysis

The qualitative content analysis aims at condensing and summarizing textual data according to the purposes of this exploratory research. My method of analysis started with the transcription of the interview audio-recordings. For this, I chose an online platform called Spext (www.spext.co), which uses artificial intelligence to fuse speech and text to automate transcription, allowing users to transform recorded content into useful text-based data faster. The generated transcripts were transferred to Microsoft Word and proofread grammatically for easy comprehension. I reviewed and organized the textual data into tables for better visualization of the answers provided by each participant. To serve as a visual summary of each participant's textual data, I created word clouds (see Appendix E). This data visualization method works by organizing text-based content into useful spatial arrangements (Martin & Hanington, 2012). The decision of adopting this technique helped me to identify the most frequently spelled words by each participant. To create these colourful word collages, I used a tool called Wordle. It allowed me to explore options of typography, maximum words to layout, colour palette, word closeness, orientation, etc. As a result, this process served as a gateway to understanding rich qualitative text-based data before moving to the following step of content analysis.

In the second analytical stage, I categorized the transcripts using brief and descriptive labels of condensed meaning—codes. In qualitative inquiry, a "code" is often defined as a word or short phrase that captures the essence of a portion of language-based or visual data (Saldanã, 2013). In the book, *The Coding Manual for Qualitative Researchers*, Johnny Saldanã (2013) has defined coding as "a method that enables you to organize and group similarly coded data into categories or "families" because they share some characteristic" (p. 9), which begins to build a pattern. Following Saldanã's (2013) advice, I codified the data through the cyclical process of

systematically organizing the information, classifying, and categorizing it into different labels. This method had to be done manually with a list of predefined concepts, and then more topics emerged during the content interpretation. To facilitate the identification and enhance the coding management, I used different colours for each code (see Appendix F).

In addition to the coding method, it was necessary to interpret the data by analyzing the findings to obtain useful insights. According to Saldanã (2013), coding is just the primary step towards a more rigorous and evocative analysis of a report. In my research, coding worked as a link that leads the data interpretation to the idea. Thus, I identified the most relevant topics that appeared during the exploratory expert interviews—shown as a pie chart in Appendix G and discussed in the *Qualitative Research Findings* section. The selection was made by evaluating which subjects repeatedly appeared and in high density, in addition to other issues that the participants explicitly emphasized as critical. I highlighted some quotes that compile well the point of the participant to create a storyline. Besides, analytic memos were used to summarize the findings and add reflections to specific perspectives of my evaluation. According to Saldanã (2013), these analytic memo writings can work as "an uncensored and permissibly messy opportunity to let thoughts flow and ideas emerge" (p. 219). This reflexive technique contributed with key pieces to review by synthesizing ideas and for possible insights guidance.

Designing AIR Packaging (Phase I)

In the beginning stages of my work on this thesis, I wanted to learn more about the role AIR technologies could play in packaging. Thus, as a response to the literature review findings, I produced a series of visual explorations, including naming, branding, lettering, packaging, character illustration, animation, digital and physical mockups, and videos-simulations. This

exploratory practice of research through design (RTD) aimed to gain knowledge and understanding through progression. As previously mentioned, I chose RTD as a method because it works bridging theory and building knowledge to enhance design practices by examining the tools and techniques of design thinking and making within the design project (Martin & Hanington, 2012).

Through the process of speculation, imagination, experimentation, and critique, it was possible to address insights derived from research of AR and AI technologies, followed by directional studies on brand personality and brand transparency. The outcome resulting from this process was a conceptual line of products and a video-simulation of AIR packaging in action. In the following, I will describe the progression that led to the artifacts resulting from this first design phase.

The Product

My design investigation started with a milk box package. This inspiration came during my breakfast beside my wife. I was looking at a milk package and asking myself, *"What if I could ask questions about this product and its package could answer me back?"* Moreover, *"What would be nice to learn from it?"* I observed that the brand was trying to convey meaning through packaging with a focus on local production. Exploring marketing phrases like *"Enjoy local freshness every day - the product of your neighbours"* and *"Choosing Sealtest is more than just choosing a brand of milk; it's choosing to make a commitment to your region."* Definitely, local food has a great set of benefits. It is often fresher and tastier, and it is also good for the environment because the supply chain is shorter, reducing food waste and the carbon footprint (Roy et al., 2019). It was from here I identified an opportunity to investigate how AIR technology could provide a more engaging experience for the consumer to connect to the

benefits of the product.

My first idea was to explore an animated character on this milk carton—from the Sealtest brand—and to visualize the anthropomorphization of that existing packaging. The results of this initial investigation (see Figure 3) were essential to understanding what illustration style and what humanized elements could be used. I identified that the cartoonish style (in both 2D or 3D) had a very childish appearance. Besides, the legs would be irrelevant since the product could stand by itself. But more importantly, I realized that working with an existing brand was quite challenging because the actual design limited the exploration of new visual elements. Therefore, to facilitate the forthcoming investigations, I decided to create a conceptual brand and product line. After researching the dairy industry's environmental footprint, I found out that all types of plant-based milk have a lower impact than cow's milk in terms of carbon emissions, land use and water use (Poore & Nemecek, 2018). These initial findings guided my research interest in designing plant-based milk packaging.



Figure 3: Allan Gomes, *Initial investigation as an attempt to anthropomorphize a milk carton*, 2020.

The Brand

The development of the brand started with the naming process. The strategy used sought to find a name that would bring inherent and immediate value to the brand. For this, I brainstormed words that would reinforce the concept of transparency and honesty (see Appendix H). From the list of names listed, the following were selected as the most promising: *Honest Goods*, *Let's be Frank*, and *I'm Frank*. To avoid any misleading association of the brand created in this project with another existing corporate name or trademark, I did a Web search to check its originality. This verification involved Internet domain name, social media handles, and Canadian Trademarks Database. The results presented "*I'm Frank*" as the most unique. Moreover, as Frank is commonly recognized as a person's name, it could also become the name of the personified packaging.



Figure 4: Allan Gomes, *Hand-lettering technique*, 2020.



Figure 5: Allan Gomes, *I'm Frank: finalized brand*, 2020.

Inspired by vintage packaging aesthetics, I decided to explore a hand-lettering technique. This allowed me to experiment with different letter-drawing styles to create unique forms, playing with curved and long shapes of the capital letter (see Figure 4). Besides the inspiration from the traditional-looking letters, I identified that several vintage brands have a particular inclination followed by a line on the base of the lettering. Considering all these factors, I sketched some ideas to examine which composition would work better for the brand. I scanned the drawings to vectorize the letters and work on their alignment. In the final version of the brand (see Figure 5), I included the exclamation mark to provide a sense of speech and action to the name. A stamp with the phrase "Augmented Frankness Technology" was designed to be used as a secondary visual element, reinforcing the brand transparency concept.

The Character

The creative process for the character illustration was an essential part of my design exploration. As discussed earlier, my journey started with an existing branded milk carton, which was trying to add some human-like elements, including arms and legs. Then, I began to focus mainly on the character's face, in which several style variations were tested (see Appendix I). Throughout these experiments, ideas were emerging, and the character's personality materialized. Insights started to arise, like incorporating visual elements into the face. I identified that by using an almond seed to represent the nose (or the eyes) of the character, I could build a connection with the main ingredient used to produce the milk. Posteriorly, I decided to replace the mouth too, this time with a bowl of milk. The cheerful expression created for Frank was designed to reinforce his friendly personality. In addition to the illustration, the front panel also had an introductory phrase saying, *"hello, nice to milk you,"* followed by the brand name, *"I'm Frank."* The idea was that it could work not only as a trigger to initiate a conversation with consumers

but also to use a pun to strengthen his playfulness (see Figure 6).

Thinking about continuity, I extended the visual identity created for almond milk to other product categories—white rice, black beans, and black tea (see Figure 7). This process pushed me to experiment with variations in the illustration of the character's face and other possible puns for the introductory phrase. Like the almond milk carton, I chose to use paper-based packages for these products, a more sustainable option because it is bio-based, recyclable and biodegradable. This exercise was essential to understand the possible directions that my project could take. From here, I moved on to the character animation stage, "bringing the almond milk to life."



Figure 6: Allan Gomes, *Almond milk - final packaging (Phase I)*, 2020.



Figure 7: Allan Gomes, *White rice, Black beans and Black tea - Packaging extensions (Phase I)*, 2020.

The Voice

Selecting the character's voice was another essential part of building brand personality. Therefore, I had to test several text-to-speech applications that convert any written text into spoken words. My initial search focused on speeches available in AI-powered platforms, such as *Google*, *IBM*, *NaturalReader* (by *NaturalSoft Ltd.*), and *macOS* (by *Apple*). At this moment, I decided to look just at male voices because, during the naming and branding process, I determined that Frank (commonly defined as masculine) would be the character's name. After testing all the American English speeches available in each system, I chose *MichaelV3* from IBM as the most appropriate to represent the brand persona.

The Animation

To create an interactive persona that could speak and express facial reactions, I had to do in-deep research on this field, looking for techniques and fundamentals. According to Bozkut et al. (2007), a natural-looking lip animation, synchronized with the speech, is essential for realistic character animation because humans are very sensitive to the slightest glitch in the human face's animation. I found some excellent resources online explaining how to create phoneme mouth shapes to simulate natural speaking (Martin, 2018; TheEndIsNearUs, 2015). These studies provided me with phoneme charts with at least 10 basic mouth shapes, as shown in Appendix J. Using this as a reference, I created my phoneme chart exploring 12 mouth forms—including 11 phonemes forms and one resting mouth (see Figure 8). It was an interesting technique to correlate each lip movement with acoustic features of speech. The synchronization was done frame-by-frame using Adobe After Effects to combine the entire animation with the audio. Besides the lip animation, it was necessary to synchronize eye movements, blinking frequently and raising the eyebrows to manifest reactions. It was my first time doing this kind of motion graphics, so it felt very challenging. At the same time, it was fascinating to see the character coming to life in the end. Finally, I created a smooth transition from the elements on the static illustration (printed) to the animated one (digital).



Figure 8: Allan Gomes, *Mouth phoneme chart (Phase I)*, 2020.

The Video-simulation

As a way to visualize AIR packaging in use, it was necessary to create a conceptual video. I started by writing down some dialogue ideas that could be explored during the two-way communication between the consumer and the package. My idea was to develop a scenario in which the conversation would flow naturally. I set some desirable characteristics for Frank's personality. Overall, he should appear honest, friendly, charismatic, wise, enthusiastic, informative, and at the same time outgoing, always playing with puns. I drove the conversation mostly to the benefits of almond milk compared to cow's milk. Specifically, I talked about health, nutrition, and environmental footprint benefits besides tips on how to consume and recipes. The intention was to demonstrate how AIR packaging can serve consumers by providing an information-rich dialogue with a brand persona that never lies.

For a more realistic scenario of use, I produced two physical mockups: one without graphic elements on the front panel of the product (used to explore the digital animation) and the second with the actual artwork printed on the front panel (used to compose the final production scene). As shown in Figure 9, my investigation started with simple background elements—blue floor and white wall. However, after capturing the first scenes, I decided to add some elements to make the composition more appealing. As pictured in Figure 10, the wood texture replaced the blue surface. A glass of milk, some almond seeds, and a potted plant were included in the video, making it seem more attractive and bringing more life to the image. The final video-simulation (see Appendix C) was essential to materialize all the insights from the literature review and initial design investigations. But more importantly, it served as a high fidelity prototype for the subsequent exploratory phase of qualitative data collection. By simulating the intended user experience, these scenarios acted as an effective method that provided a gateway for expert feedback.



Figure 9: Allan Gomes, *First scenario composition (Phase I)*, 2020.



Figure 10: Allan Gomes, *Second scenario composition (Phase I)*, 2020.

Qualitative Research Findings

As previously mentioned in the *Methodology* section, the benefit of the expert interview lies in its unique ability to obtain knowledge from the expert, broadly characterized as specific knowledge in a particular field of action (Döringer, 2020; Meuser & Nagel, 2009). In the following section, I will be presenting the insights gained from the expert interviews conducted during the qualitative data research. The findings reflect on the participants' alternative assumptions and ways of seeing the design outcome of the first visual exploration, which was presented as a video-simulation (see Appendix C). For that, I mapped out the codes identified as opportunities for improvements in terms of technical, business, and social goals. Additionally, I observed the critical factors pointed out as challenges or barriers to AIR packaging adoption. The full list of codes organized by categories is illustrated in Appendix K.

1. Opportunities

As an emerging technology, Augmented Intelligent Reality has the potential to change the way people interact with Consumer Packaged Goods. During the qualitative data collection, I identified many key factors that could be used to expand opportunities in the design project. To better understand the insights provided, I divided the codes into three categories and, with the use of memo writing as an analytical strategy (Saldanã, 2013), I extracted meanings from each of them (see Appendix L).

1.1 Technical Goals

As all participants have extensive knowledge of modern technologies used in retail experiences, there were many technical contributions to my design concept. In the following, I will present some of the most relevant technical suggestions provided by the interviewed experts.

Innovation: Several participants highlighted AIR packaging as an innovative two-way

communication tool for companies. Participant 07 stated that *"it can be an effective tool, in CPG companies, a lot of the communication is just one-way communication to consumers, and to build on that experience, I think that bridge of having that two-way conversation with that Q&A is something that CPG companies have never done before."* In the same way, participant 01, highlighted that the use of voice-activated systems for packaging has never happened before (P01). Participant 01 further pointed out that this investigation *"is great because the future of interactivity is going to be voice-enabled. We're just not aware if it's a slow adoption rate, but it's a great way of engaging with the audience."* Additionally, participant 02 stated that *"the concept of AI combined with an interface having a natural conversation as a way to interact with consumers has a lot of potentials"* and that *"having a conversation with the package as a persona can open many doors."*

Interactive Media: Even though participants stated that voice assistant for packaging is an innovative and promising approach, several participants suggested that the interactivity should move beyond the conversation. Participant 05 argued that there are many opportunities for improvements because *"technology is continuously evolving possibilities even to project holograms or show images and videos. It can just become endless."* The same participant further stated, *"if you had the chance to make the concept be able not just to talk but also to project images and videos. It will make the experience, basically, even more light and engaging."* Similarly, other participants suggested adding some touchable elements on the screen, like buttons (P01; P03). Moreover, they proposed the possibility of playing short *"videos showing something in operation"* or providing a journey which *"the person could learn about it by making choices"* (P03). Participant 03 also recommended the use of a quiz as a way to *"add a fun element making it more engaging [because] most people are short of attention span, especially*

nowadays, so that would be something to overcome." In this context, a quiz could be used as a gamification strategy by creating a sense of reward, achievement, motivation, and challenge to the learning experience.

Gamification: Some participants mentioned the concept of gamification as a technique to increase engagement levels with playful interactions. Pokemon GO was cited as an excellent example of augmented reality being used for gaming (P01; P02; P06). Participant 03 explicitly highlighted an expectation for more engagement via gamification in a scenario where *"the consumer would need to take actions or perform something, win something, do something more than just listen and aside from the initial"*, which was agreed by participant 02, who further pointed out the potential to do *"something like Starbucks has done, they have an AR simple game, the idea is similar to Pokemon GO"*, which the user has to capture stars to win a prize. The purpose of the campaign is to make consumers engage with their app, thinking about continuity and creating loyalty (P02).

AI Personalization Opportunities: Based on data science, AI-powered systems can deliver personalized experiences in real-time (Fiorini, 2018). Several participants agreed that AIR technologies could open many doors for the integration of parallel networks. For example, participant 01 suggested that AIR packaging could recognize users *"as individuals"* and give them *"personal advice"* based on their recorded data. Participant 07 indicated that it could be connected to *"smart grocery lists, smart devices and smart appliances."* According to participant 04, the AI system could be used as a learning algorithm to *"suggest some recipes"* or provide health care guidance based on *"your kind of health profile or your physical profile."* Connected to that idea, participant 01 also suggested that the *"augmented reality could be linked to [the user's] doctor"*, imagining a scenario where *"you're asking questions [to the package and] that*

sends a trigger to the doctor, and he/she gets involved" (P01).

1.2 Business Goals

Among all the participants in this study (total of 8), 7 of them have a strong involvement in the CPG industry, holding an in-depth understanding of business strategy and innovation for the retail industry. During the interviews, it was confirmed that AIR packaging has a high potential to help companies with their marketing goals. I will present in the following some of the most relevant aspects pointed out by the experts regarding business strategy.

Brand Persona: Some participants emphasized how intelligently the brand persona was explored in the project (P05; P06; P07). Participant 05 explicitly highlighted that the character speaks *"very honestly, it was very open to say good and bad things."* The participant further suggested that Frank should be seen more *"as an ambassador of certain things [...] that makes the Frank concept even more powerful because he is the one that is actually carrying the news, good or bad"* (P05). As an information vehicle, participant 06 believes it was well developed in a way that Frank *"states true throughout the simulation experience, and as [the user] starts to talk about certain things, that goes into and expands into other product areas."* According to participant 07, a critical aspect of the design presented is *"simplicity."* It was highlighted how clever *"the static dimension of the design"* such as the package illustration turns into *"the voice and face of the brand"* (P07). Participant 06 confirms that idea by arguing, *"I absolutely love the way you build the brand ground up, so it's just like the notion of one thing we talk about as brand stewards, how you bring the brand and the product together, and you augmented them in such a way that is seamless for the consumer."*

Consumer Engagement: All the participants endorsed that AIR packaging can be an excellent tool to promote higher engagement levels among consumers. Participant 01 defined

engagement level as *"low engagement would be I scan over my phone, and I get a commercial. While high engagement would be, I'm asking questions to my phone using AR, and it's giving me the answers."* Participant 05 added that *"the engagement level with the AIR packaging was much higher than any potential wrapper or just printed surfaces."* Moreover, AIR packaging can *"engage with consumers in a much more interesting and effective way, at their own pace,"* stated participant 05. Even though the experts highlighted the benefits in terms of engagement level, many of them were still skeptical about the time consumers would spend interacting with the product—defined as Dwell Time. This topic is further discussed in the *Challenges & Barriers to AIR Adoption* section. Some of the suggestions to increase engagement level were previously discussed over *Interactive Media* and *Gamification* topics.

Storytelling & Space on Packages: The communicative characteristic of the AIR packaging concept has made many participants point out storytelling as one of the foremost marketing goals to be achieved (P01; P03; P05; P06; P07). Participant 01 emphasized that it can *"do a better job of telling you a story, do a better job of promoting the key features of your products, do a better job of promoting value"*; therefore, *"it's a fantastic tool for storytelling."* This was confirmed by participant 05, stating that *"it was an excellent way to display the capability of using these new technologies and apply them to packaging storytelling and for giving more details about production processes and packaging or other benefits that consumers, unnecessarily, can discuss from."* The limited space in packaging was identified by participant 05 as the most challenging factor for storytelling in CPG products. At this point, AIR technologies can *"help brands to talk to consumers and tell that story that they cannot tell through the limited space of the package"* (P05). As a consequence of AIR's ability to tell a story, other marketing goals can be explored, such as brand transparency, brand trust, brand loyalty, and brand values.

1.3 Social Goals

Besides the technical and business goals highlighted in the previous sections, the participants also identified that some social goals could be achieved. In the following, I will discuss the most relevant aspects of AIR packaging for educational and informative purposes, such as promoting responsible consumption, environmental sustainability, and health care.

Educational Tool: Many studies in the literature emphasize how Augmented Reality has excellent education potentials, specifically in learning experiences (Sural, 2018). By adding the "intelligence" to it, this technology can be even more useful as an educational channel. According to participant 06, exploring two-way communication in products *"was clever in terms of being both educational and entertaining, with some of the jokes and the puns that were quite good as well."* Participant 01 also sees AIR packaging being used as an "information-rich" channel, delivering "the news of the day" like a TV does or informing whatever the company wants to relay. Participant 03 added that *"by educating and teaching people about the process or whatever the product is,"* it could be building brand transparency and brand trust. As a medium to inform consumers, participant 06 confirmed that AIR could promote *"responsible consumption or guide people through recycling processes, like disposing of in the right way."*

Health Care: Many participants highlighted that AIR packaging could contribute to consumers' lifestyles, specifically regarding healthcare guidance. As discussed earlier over the topic *"AI Personalization Opportunities,"* some participants claimed that AIR technologies could be connected to the user's health profile, providing recommendations or triggering their doctor (P01; P04). Participant 07 further stated that it *"could be even red-light recommendations, not something fully directed, but maybe suggestions of other benefits like products that might be more useful at the time of consumption."* According to participant 01, it could be playing

"different roles depending on the category, needs of the consumer, and how much of it is lifestyle versus safety-driven." Connected with this, participant 06 mentioned that consumers are often engaging with several apps that track their food consumption and activities. *"So, is there a way of integrating that? You scan the package and right away, like your app picks up that and correlate multiple points"* (P06).

Sustainability: As illustrated in the pie chart in Appendix G, sustainability was the second most discussed topic during the interviews. This is, essentially, because of the broad scope and importance of this theme. Furthermore, the first video-concept explored conversations around sustainable products, which guided specific discussions with the experts. Participant 01 mentioned that there is still a lot that the package *"could be talking about from the sustainability standpoint of Almond versus Dairy."* It was further pointed out that almonds are not thoroughly environmentally friendly because *"almonds use the most amount of water, so it's a big issue in California"* (P01). Overall, participant 01 affirmed that AIR packaging could serve companies and society in several ways, such as amplifying the discussion *"about sustainability and environmental concerns,"* that could be *"everything from water to carbon footprint,"* or even *"about the way you treat your employees."* This idea was confirmed by other experts when asked if AIR strategies for packaging could contribute to the ethical goals of CPG companies. Participant 03 declared, *"I think that anything around sustainability or CSR (Corporate Social Responsibility) related."* However, participant 03 further stated that it should be *"supporting other elements of the brand,"* therefore AIR strategies should be connected to the company or organization's mission to succeed. Participant 05 also believes it is a powerful tool for conveying sustainable practices, especially *"when it comes to sourcing or ingredients, there are a lot of interesting programs out there that companies are struggling to communicate in the right way, so*

it can serve very well for the purpose." From the social responsibility standpoint, participant 06 emphasized that AIR packaging has the potential to promote *"responsible consumption and sustainable recycling" among consumers "while they consume the products."* In line with this idea, participant 07 mentioned that it could benefit consumers by informing how CPG companies engage with the *"circular economy, or some people call it, cradle-to-cradle versus cradle-to-grave. In terms of that initiative, and what is being done with the waste."* Participant 08, in turn, argued that it is potentially helpful for brand transparency. Nevertheless, the system would be more trustworthy if it is *"handled by third-party environmental organizations that will certify that a company is not using such chemicals, following recycling standards, or having animal welfare, that sort of thing"* (P08). Overall, it was confirmed that AIR packaging could benefit both companies and society, as long as this tool is not used in a manipulative way to deceive consumers or distort information in an attempt to increase profit.

2. Challenges & Barriers to AIR Adoption

Besides the previously identified opportunities, several challenges and barriers were pointed out as limitations to implementing AIR packaging. As shown in Appendix M, the list of codes was divided into two categories: *Consumer Adoption* and *Ethical Issues*. In the following, I defined some of the most critical issues discussed, which serve as support for the subsequently developed conceptual video and conclusions.

2.1 Consumer Adoption

Findings in the literature have shown that consumer acceptance is one of the most critical factors for the success of new technologies in the marketplace (Wiebach & Send, 2019). This was confirmed by many participants who highlighted the great uncertainty about the acceptance of new technologies. Findings from data show that, for the success of AIR packaging in the

market, it is necessary to define the trigger points used to encourage consumers to interact with the package and if this interaction is long enough to create a rich experience—dwell time. Besides, setting the differentials offered by the AIR system compared to other ways of obtaining information and determining the right target audience is vital to avoid failure.

Dwell Time: In AR experiences, users must dedicate time to entirely focus on the screen and be completely immersed at that moment (Emrich, 2020). Similarly, for a high-quality dwell time within AIR experiences, it is necessary to keep the user's attention as fast as possible by giving them meaningful things to do and interact with. After watching the first video-concept, some participants highlighted that the average consumers would give up on the experience after a short amount of time. (P01; P02; P03; P07). Participant 01 argued that consumers are *"on a mission for some answers, so [AIR packaging] would have to be information-rich on things and problems that it's solving for them."* This was confirmed by participant 02 by stating that while purchasing, *"in most cases, consumers have enough information they need, and people will not be in a supermarket scanning every single package to understand the story behind all of them."* Participant 03 added that *"when people are on the go, they're impatient,"* so they often have a short *"amount of attention span."* Participant 03 further asked some critical questions, such as *"Will that hold the consumers' attention? Is there enough there that's compelling for someone to listen?"* Participant 07 argued that for new technology to succeed, it must be *"frictionless."* While using an app, consumers *"are not willing to go through five steps anymore, if they can't achieve in one or two steps, they will give up"* (P07).

Triggers: Several participants drew attention to the trigger points that would be encouraging consumers to connect and interact with the package through AIR. Without these mental triggers influencing the audience to take action, a marketing campaign using AIR

packaging could become unsuccessful while trying to deliver the message. Participant 02 emphasized that just a few designers think about the triggers when exploring new technologies, and *"that is why most of these technologies are failing"* in the marketplace. According to participant 02, AIR packaging has many potentials as long as the trigger points are well managed. If consumers use AIR packaging to get informed, *"instead of a type on the internet"* (P02), it is successful. Participant 03 mentioned that it is necessary *"to understand what motivates the consumers as it relates to the package."* These incentives can happen in many ways. For instance, it can *"be some kind of massive learning or free experience like a free yoga class,"* added participant 03.

2.2 Ethical Issues

Besides the critical factors regarding consumer adoption, the interviewed experts reported some ethical (and legal) concerns that can be seen as challenges and barriers. For instance, it was pointed out that the government heavily regulates food and beverage packaging for health and safety reasons. Therefore, it would be the first barrier to overcome. Other concerns about consumer data privacy were also reported—such as how the system will collect, store and use their personal information. Some participants were worried about whether the system is kid-friendly since the animated character present in the packaging would be very attractive for children.

Packaging Regulations: After years of experience working inside multinational CPG companies, participant 07 has acquired a consistent packaging regulation background. According to participant 07, one of the most significant resistance against AIR packaging *"comes down from government adoption because food and beverage are so heavily regulated."* Companies are not allowed to say several things on their product packaging—especially in Canada (P07).

Therefore, in a product that can speak directly to consumers, regulations imposed would not be different. Participant 07 highlighted that some risks were mitigated in the example presented through video-simulation when the character avoided recommending consumers stop drinking cow's milk. Still, governing bodies will probably be the largest obstacle for AIR strategies for food packaging (P07). Participant 07 further suggested that this technology should not be initially applied to food packaging. Instead, *"it might be starting to get widely accepted and widely used in a particular category before it transcends over into food"* so that it can work as window adoption considering its scalability (P07).

Privacy Concerns: As digitization penetrates every aspect of the retail system, various ethical and social issues manifest themselves per technology in different ways (Royakkers et al., 2018). For instance, privacy concerns draw attention to how companies collect, store, and manage users' personal information. This was confirmed by several participants who pointed out possible risks regarding consumers' data security when interacting with AIR technologies since it will be accessing their camera and microphone (P01; P03; P06, P07; P08). According to participant 08, the manipulative use of AIR can allow marketers and psychologists to get out ahead of what the average of consumers can detect. It can go beyond what has been done within social media. *"This could be used in ways that it's hacking us at some fundamental cognitive level that we can't consciously perceive,"* highlighted participant 08. It was further explained that because our social processing is built to be interactive, which is a kind of predictable mechanism, companies could hack it easily. By detecting consumers' social gestures, such as facial expressions or voice intonation, *"it might be a lot more powerful and powerfully manipulative than television commercials could be"* (P08). Besides, participant 08 pointed out that the number of intermediaries involved in the AIR system might make a big difference to public reception. A

key question was raised, *"How many different technological intermediaries have access to this data? The phone company, the app maker, the consumer product brand that is marketing itself"* (P08). Conclusively, it was emphasized that if used manipulatively by stakeholders, AIR technologies would *"get a honeymoon period,"* in which people don't understand it at first, but then, after a while, there would be an extreme *"cynical backlash"* to that (P08).

Designing AIR Packaging (Phase II)

Grounded in the qualitative research findings, I decided to develop a second design project, exploring the identified opportunities for improvements and looking for alternatives to overcome some factors pointed out as challenges or barriers. To guide my investigation, I used the following questions raised during the coding analysis: *"How to enhance customer engagement?"*, *"How could gamification be used as a strategy to add some value to the customer experience?"*, *"What mental triggers could be used to encourage interactions and make users take specific actions?"*, *"How could AIR packaging be used to compare products of the same category?"*, *"How could AIR packaging be used to promote supply chain transparency?"*, *"How could AIR packaging be integrated with external services (like health systems) to deliver personalized experiences?"* To answer these questions and evolve the design, I used some critiques to restructure the product line. Then, I produced a second video exploring a scenario with enhanced levels of interactivity and engagement.

Rethinking the gender

The first step in the design evolution came from the brand persona. Although branding was pointed out as one of the well-executed features in the first project, there were some criticisms regarding the character's gender. It was a beneficial feedback because it made me question why we gender AI systems. In my case, the decision to use male voices came from the

brand personification process. Meantime, after rethinking this strategy, I was pushed to look for an alternative name, and I found out that the brand *Frank* could be replaced by *Frankie*—commonly used as a unisex name ("Frankie," n.d.). The new version of the brand is shown in Figure 11. At this point, I could use different speeches for different products, including male, female and genderless voices. During my research, I identified a lack of text-to-speech systems offering gender-neutral options, which led me to experiment with audio software to modify the speech's frequencies to a range between 145 and 175 hertz—the intersection of male and female vocal ranges (Danielescu, 2020). Although I found this investigation very enriching and with potential future developments, I chose to avoid using genderless voice in my project because it would require a more in-depth analysis. Findings in the literature show that multiple elements need to be considered to design a non-binary voice (Sutton, 2020). It is essential to understand the social aspects that influence gender performance through speech. Thus, just changing the voice pitch would not be enough to create a gender-neutral persona. Moreover, confusing users concerning the character's gender could go against the brand personality and brand transparency strategies chosen for this project.



Figure 11: Allan Gomes, *Brand update (Phase II)*, 2021.

Expanding the product line

As presented in the first design investigation, I had the intention to expand the product line to other categories, like white rice, black beans, and black tea. However, after analyzing these products, I realized that it could lead to superficial conversations about the product benefits and production process. Therefore, I decided to keep the focus of my exploration on plant-based milk because this product category provides a stimulating discussion regarding sustainability. I already had designed the almond milk package, so I expanded it to have a complete product line. The first step was to structure the products' portfolio and keep using puns in short phrases on the front panel. For this, I brainstormed ideas by playing with different words (see Appendix N). I opted for using the name of the main ingredient (like almond, soy, cashew and oat) instead of using secondary words (like nuts, seed, and milk). Another strategy was to replace the greeting phrase, such as *"Hello, nice to milk you,"* with sentences reinforcing the brand transparency strategy, such as *"I don't lie, cashew see?"*. To highlight the words conveying a double meaning, I used contrasting colours and different typography.

The final result was a product range of five distinct flavours, including almond, walnut, cashew, oat, and soy (see Figure 12). To facilitate the differentiation among products, I designed each of them with a contrasting colour and iconic illustration of the main ingredient. Besides referring to the flavour of each milk, the drawing serves as the character's nose. All the five milk cartons were laser printed and assembled to serve as a physical mockup in the next step of video recording.

Developing a transparent dialogue

The first design project covered mostly a discussion regarding the benefits of almond milk compared to cow's milk. To produce a richer conversation in the second video, I researched

not only the benefits of each type of plant-based milk but also the problems related to their production process. Specifically, I looked at their nutritional comparison, health benefits, environmental impact, animal welfare, and fair trade practices. Considering all these factors converging on a better supply chain visibility, I was able to explore in-depth discussion about social responsibility practices. After this research, I created a storyboard (see Figure 13) to serve as a visual narrative of the dialogue and interactions with the products, considering the context in which AIR technology would be used. This technique was essential to explore alternatives in the early phase of the design process.



Figure 12: Allan Gomes, *Complete line of plant-based milk (Phase II)*, 2021.

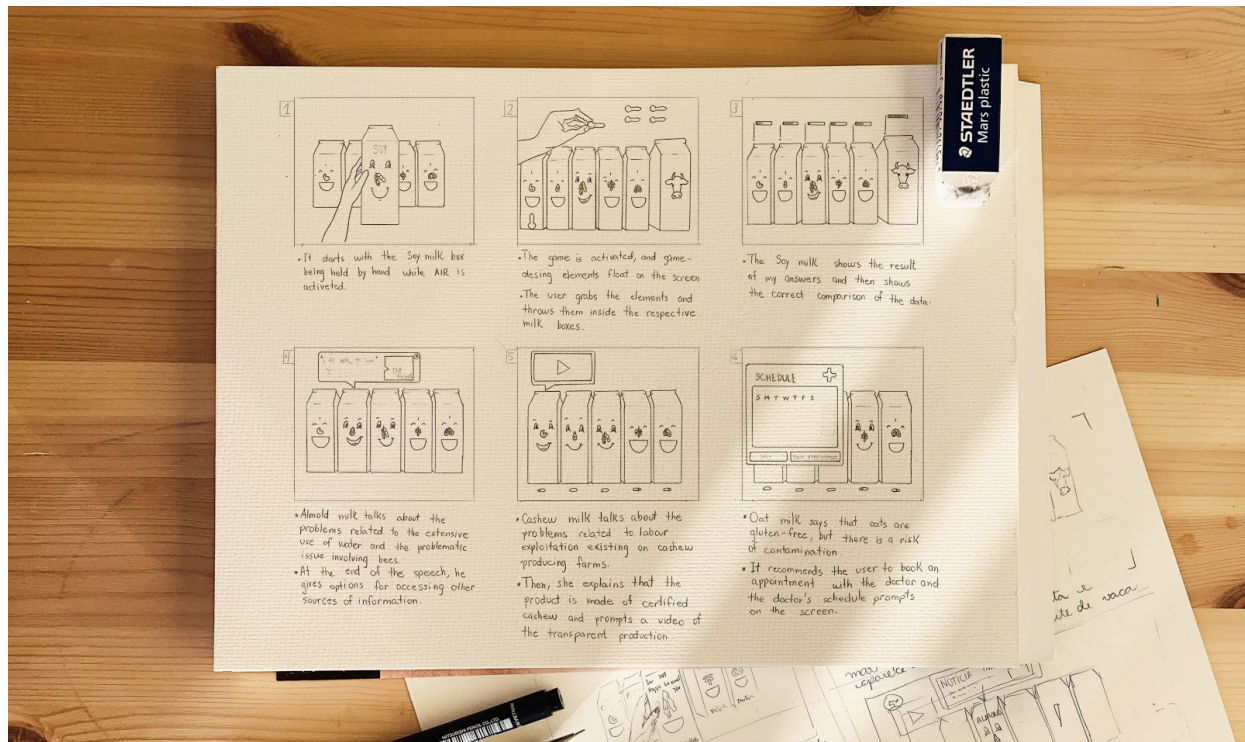


Figure 13: Allan Gomes, *Storyboard - Conversations and interactions (Phase II)*, 2021.

Exploring Design insights: Second Video-Simulation

As a way to answer the questions raised during the coding analysis, I produced a second video (see Appendix O), exploring opportunities for improvements and alternatives to overcome the challenges and barriers. This investigation was divided into three sections. First, I considered product comparison opportunities. To illustrate this scenario of interaction, the user asks the system to compare the environmental footprint in terms of water usage. Then, the system triggers the consumer to play a game in order to win a 10 dollar discount. The game is actually an interactive quiz in which the user needs to drag and place the values (digitally set on the screen) in the corresponding product. By using gamification principles, I aimed to demonstrate how AIR could encourage interactions and enhance the learning experience, creating a sense of reward, achievement, and challenge.

Second, I explored the honesty of the product by challenging the character to talk about the dark side of the supply chain. I aimed to employ brand transparency to demonstrate how AIR packaging could contribute, in an engaging manner, to the development of a compelling perspective of social issues in the supply chain. The literature has already shown that engaging with corporate social responsibility practices can benefit companies in several ways, enhancing consumer product evaluations, satisfaction, and trust (Armstrong Soule et al., 2015). To increase the system's reliability and avoid biased messages, I provided access to the information source. This fact-checking function allowed the user to verify any information provided. Simultaneously, it opened up the possibility of using some interactive media, such as buttons, videos, images and links to websites, during the communication. The use of touchable elements was suggested by the interviewed experts as a technique to overcome the short attention span of consumers. Thus, allowing them to take action would make the experience more engaging.

Lastly, I decided to create a situation in which the system would face potential consumer health risks. Even in products offering low-risk associated with consumption, it is essential to identify occasions that the information provided could be misrepresented or morally irresponsible, threatening consumer safety. Therefore, I proposed a condition in which the consumer reports potential gluten sensitivity symptoms and the product is pressured to say whether the consumption of oat milk can be harmless. In turn, this opened up a possibility for using recorded data to deliver personalized support in integration with external services, like healthcare systems. As suggested by the experts, AIR technology has the potential to provide specific assistance, making people's lives better in many ways. In this sense, I proposed to use recorded data to trigger the consumer to get a medical appointment. Thus, a window with the schedule of the user's family doctor was prompted on the screen.

Conclusion

As AIR technologies evolve, becoming more accessible for companies and improving information transfer, a broader spectrum of consumers and stakeholders will be able to access more information about what happens within supply chains. As a result, companies engaged with Environmental, Social, and Governance (ESG) practices can make their businesses more transparent to themselves and the public. This study aimed to answer the following research question, “*How could AIR (Augmented Intelligent Reality) be designed with packaging to promote socially responsible products, ideas and behaviours?*”. This was done by developing visual experimentation via Research Through Design (RTD) and conducting qualitative research via expert interviews and focus groups.

The methods I chose in combination with the theoretical framework were ideal for shaping this research outcome. These methods encouraged me to speculate through practice, permitting this study to challenge the sense of what is possible. Specifically, by raising the question “What if?”, which allowed me to propose ideas and, most importantly, forecast scenarios of desirable futures. As highlighted in the literature, by asking several “What if?”, designers can be proactive rather than reactive (Tharp & Tharp, 2019). Indeed, it opened up countless possibilities to be explored in a projective sense. As a result, instead of *redesigning* packaging, my research aimed to find ways to *resignify* the role of packaging in our social spaces. The exploratory design process itself served as a form of gaining insight and knowledge through the progression. Simultaneously, the body of work created helped guide the qualitative data collection, which was a crucial process to an in-depth understanding of the topic because it provided more diversity and enrichment to the exploratory discussion. Conducting expert interviews and focus groups permitted me to obtain knowledge from experienced professionals

from different fields of action. As a result, I could map out the opportunities for improvements in terms of technical, business, and social goals. Moreover, it revealed some critical factors that could be seen as challenges or barriers to AIR packaging adoption.

Overall, this study has generated valuable insights into the impact AIR packaging can have on brands that want to promote their ESG activities. As a marketing tool, I believe AIR packaging has the potential to achieve positive outcomes for companies, designers, consumers and society as a whole. When combined with marketing strategies, such as brand personality and brand transparency, AIR becomes a powerful vehicle to provide two-way communications between consumers and organizations, which is an essential factor in establishing trust and securing reputation. Consumers—particularly Millennials—are increasingly looking for brands that embrace purpose and sustainability (White et al., 2019). In this sense, AIR packaging would effectively contribute to stimulating sustainable business development by making their product's positive attributes—such as ecological, fair trade, and animal welfare practices—available for the public. Besides the benefits in terms of sustainable business strategy, it can be seen as an educational tool that informs consumers about the production process throughout chains and makes them aware of the environmental impact of the products they consume. Moreover, it can contribute to socially responsible consumption in a fun and engaging manner, delivering personalized and memorable experiences.

Some of the speculations presented in this study go beyond the packaging and design context. Several "What if?" questions were raised while exploring opportunities, barriers and challenges of promoting an AI system that needs to be ethical and sustainable. I recognized that, for AIR packaging to be useful in promoting ESG practices, it is necessary to develop an AI system that is fully honest and proactively provides information that might go against the

self-interests of the business. For instance, if used for unethical or unsustainable CPG, it should allow consumers to get information about the dark sides of the supply chain, which speaks against the purchase. This is ethical and makes AI sustainable in the interest of society. A dishonest AI—including AIs deliberately withholding substantive information to promote its creator's interests—would lose credibility and value as a source of information. To avoid negative backlash, it should go beyond just the honesty and comprehensiveness of information. It is necessary to follow transparent privacy standards—which was a critical factor pointed out by the interviewed experts—and not abuse or sell customer data—which is pervasive these days.

I envision that, in an alternative future where several brands would be using AIR packaging to promote their ESG practices visibility, consumers would start to react negatively to the low-transparency of competitors that don't use this technology. Consumers might interpret the lack of transparency as the brand hiding undesirable information throughout the supply chain. Thus, by offering a tool that can potentially benefit greater transparency, companies might feel the need to adopt even more socially responsible practices to meet consumer demand. By doing so, brands can simultaneously achieve social gains, mitigate inherent criticism, and build barriers against potential competitors.

Although the research described herein is only an initial move in starting the investigation process, I hope this work motivates more scholarly and commercial interest in this strategy. Over the next years, AR applications combined with AI systems are expected to be adopted more widely in all aspects of our daily lives, but especially in retail. The way in which these technologies are going to be driven by corporations is still unclear. However, literature has continuously anticipated that the path to the future of business must be sustainable-based.

Limitations & Future Research

There were several limitations to this research, indicating directions for further research. First, the qualitative interviews were conducted only with experts from Toronto-based companies. This geographic limitation imposed should be avoided to provide a more expansive and multicultural perspective on the field. Although the interviewed participants hold an in-depth knowledge of consumer behaviour, their experience may be based on a North American standpoint. In turn, experts from other cultures, such as European, Asian or developing countries, might contribute differently. Besides, the low number of participants can be seen as a limitation. Interviewing a larger number of experts—including non-marketers, such as environmentalists, sociologists, AI specialists etc.—would contribute with more shrewdness and critical thinking to the project before putting it into practice.

Second, it is also possible that scenarios created during this research may not reflect the actual consumer behaviour while interacting with AIR packaging. When creating fictional scenarios to illustrate the use of new technological tools, it is a concern that users' responses may be biased with the designer's desire to show opportunities. However, the insufficient time within the master's program, in addition to barriers of practical and technical knowledge, has limited the production of a functional prototype with a built-in AIR system. Therefore, further studies could replicate the present research examining AIR packaging in a field experiment, providing an actual prototype for usability testing and consumer behavioural analysis. This would add strength and depth to my findings.

Third, for complete socially sustainable development, focused on ensuring that no one is left behind, AIR packaging should provide a unique opportunity to create more inclusive and equitable societies. For this, it has to consider an inclusive technology that respects the needs of a

broader spectrum of people. It means including those with different impairments (e.g., hearing, visual, motor or cognitive), elderly, minorities (ethnic, vulnerable), alongside other groups excluded as exceptional talents and immigrants, which could be further explored in a phase of usability testing and consumer behavioural analysis.

Fourth, as discussed earlier in the *Qualitative Research Findings* and *Conclusion* sections, there are several limitations regarding privacy concerns. To fully succeed as a trustful communication medium, AIR technologies will necessarily need to follow transparent privacy standards and not abuse or sell customer data—which is pervasive these days. The issue with privacy in AIR concerns the new ways of tracking people's behaviour in blended spaces—which encompasses the real and the virtual environments. Losing control of sensitive information can happen in many ways, for instance, monitoring people, recording and passing on details of their personal data. Therefore, it can be seen as the biggest barrier to overcome in AIR packaging implementation. One of the routes suggested here for future research is that AIR platforms could be powered and managed by third-party organizations, like NGOs (Non-Governmental Organizations) and NPOs (Non-Profit Organizations). As a result, AIR would start to be seen not only as a communication tool but also as a certification that sets the global standard for socially responsible products.

Finally, as the conceptual framework was designed specifically for AIR packaging applied for food categories, it is expected that, in different circumstances, the socially sustainable practices discussed here might be irrelevant. For instance, if implemented in pharmaceutical products, making labelling information accessible for the elderly would be more vital than providing supply chain transparency. Besides, the scenarios explored in this study were limited to post-purchase interactions. Therefore, other consumer-product interactions should be further

investigated to cover various usage situations during the consumer journey. For example, simulating AIR packaging at the point of purchase (POP) might lead the discussion to different findings regarding opportunities, challenges and barriers. Future research should aim to contribute by investigating AIR packaging in a broader sense, looking beyond food and beverage and for a wider range of usage situations, perhaps, asking the "*What if?*" question continuously to enlarge the speculative process. What if AIR packaging could be used on this product? What if consumers could interact with AIR packaging in specific situations? What if new layers of technology were added to AIR packaging? By varying AIR's focus, researchers could achieve other positive objectives for a more desirable future.

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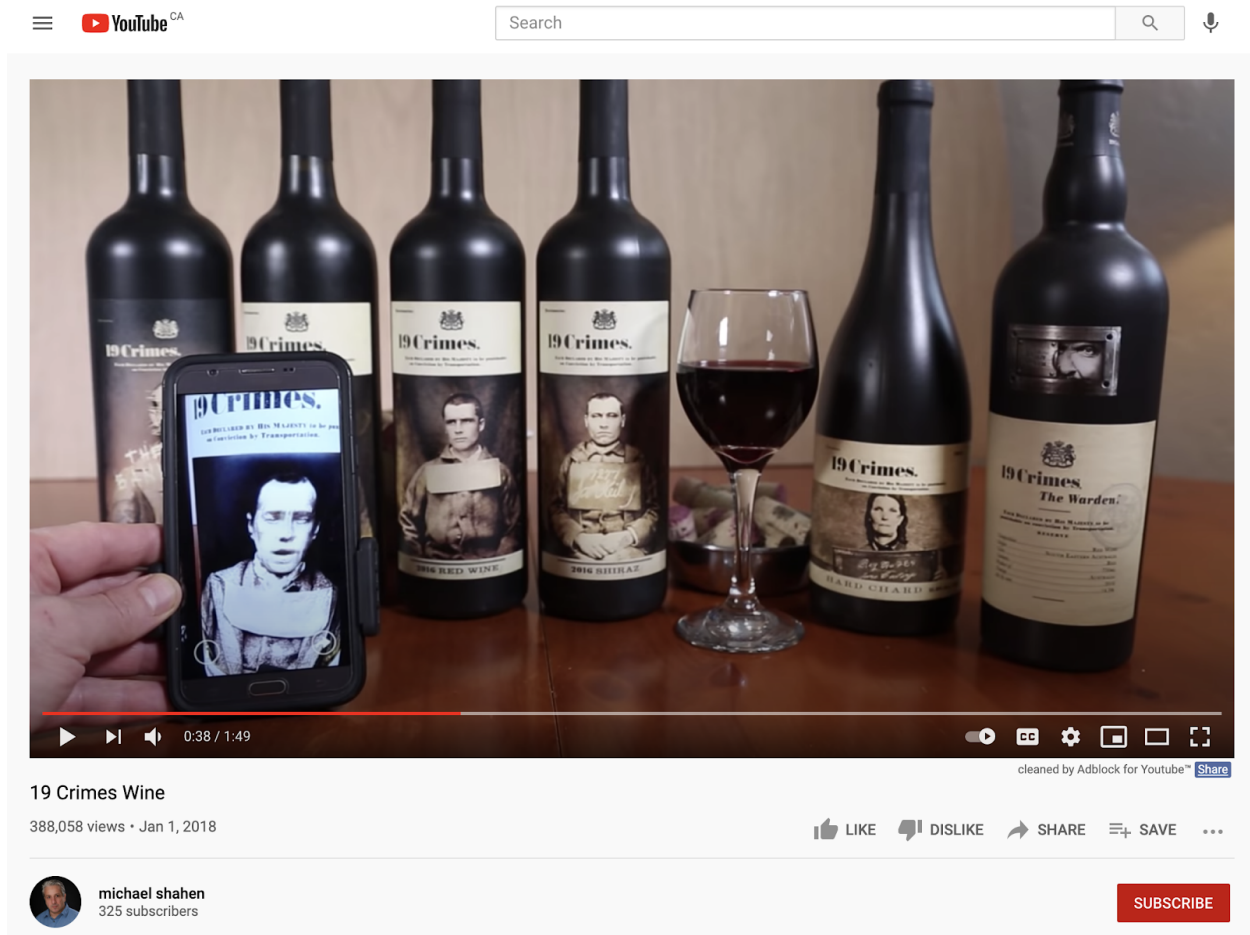
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Appendix A

19 Crimes AR Packaging - *Example of storytelling.*

Video available at:

<https://youtu.be/9pjrl3ORqXM>



Shahen, M. (2018, January 1).

19 Crimes Wine [Video]. YouTube.

Appendix B

Semi-structured interview - *Introduction Script.*

Opening phase:

Hello XXXXX, how are you?

It's nice to meet you virtually.

Thank you for participating in the study. My name is Allan Gomes. I'm a Master of Design student at York University. As mentioned earlier by email, my research aims to speculate about the use of Augmented Reality (AR) and Artificial Intelligence (AI) on packages to promote socially responsible products, ideas and behaviours. My study uses a design concept in a video format to explore new ways of interaction between consumers and products.

Your participation in this research will contribute to an in-depth analysis of the visual production to find connections and gaps in the proposal. Moreover, your knowledge of technology, marketing strategy and consumer behaviour will be essential for improving the outcome of this study, so feel free to criticize and point-out any aspect that you think is necessary.

In the resulting thesis and, possibly, magazine or journal publications, any answer you give during this interview will only be used in an anonymized way, which does not allow identification of you or your company. For example, I will write, "According to a brand manager of a large multinational CPG company...", "In the opinion of a design expert of a Toronto-based design agency...", etc. You have, of course, the right to waive anonymity, and I would be happy to quote you, for all or select your answers, with your name and/or position.

Please let me know if and when you would like to be quoted.

Do you mind being recorded during this interview?

This interview will consist of three sections: 1) I will be asking some general questions about the use of Augmented Reality packaging; 2) Then I will play a 4-min video demonstrating my design concept; 3) Finally, I will be asking some specific questions related to your interpretation and thoughts about the work presented through the video.

This survey will take no longer than 45 minutes. During this time, if you feel uncomfortable or not feel the need to continue, you can quit anytime.

If you have any questions about the study or your right as a participant, I would be happy to respond.

If you're ready, let's begin!

Semi-structured interview - *Questionnaire Draft*
(used for P01, P02, P03, P04, P05, P06, and P07).

Warming-up phase:

2 - To start the questioning, could you tell me more about your professional background?

Questioning phase:

3 - Are you familiar with Augmented Reality (AR) packaging?

4 - Can you think about any good examples of brands using AR packaging?

5 - What do you think consumers would like to learn from products if they could talk to its package?

6 - What would the company like to convey to consumers through their product at the time of consumption if consumers could talk to their products?

Show the video demonstration (Duration: 4-min)

Probing phase:

7 - What were your first thoughts after watching this video demonstration?

8 - How far do you think we are from seeing this technology being used in products?

9 - Do you think that AIR packaging could be an effective tool for CPG companies?

• Why? Or why not?

• If yes, what are the Marketing goals that you believe CPG companies could pursue when using Augmented Intelligent Reality on their packaging? (This could include consumer psychological goals and/or consumer behavioural goals.)

10 - Which target groups, if any, do you believe would be most effectively addressed with or attracted by AIR packaging? What would be the benefit?

11 - How do you think that AIR strategies for packaging could contribute to the ethical goals of CPG companies? (For example, Social and Environmental Sustainability, Corporate Social Responsibility, or addressing any other Societal Issues)

12 - How do you think this design concept could be improved to make the interaction between consumers and products even better?

13 - Besides technological issues, what risks, difficulties or obstacles would you see in implementing AIR packaging? (For example, legal issues/risks, resistance by or necessary collaboration with retailers, practical issues in programming the system or designing the packaging or character, consumer disinterest etc.)

14 - To finalize, is there anything else or question you have to ask me?

Closing phase:

Thank you so much for your invaluable help during this interview and for all the clear answers that you provided. You were very helpful, I hope you found it interesting.

I will stop the recording now.

See you, bye.

Semi-structured interview - *Questionnaire Draft (used for P08).*

Warming-up phase:

2 - To start the questioning, could you tell me more about your professional background?

Questioning phase:

3 - Are you familiar with Augmented Reality (AR) packaging?

4 - Can you think about any good examples of brands using AR packaging?

5 - What do you think consumers would like to learn from products if they could talk to its package?

6 - What would the company like to convey to consumers through their product at the time of consumption if consumers could talk to their products?

Show the video demonstration (Duration: 4-min)

Probing phase:

7 - What were your first thoughts after watching this video demonstration?

8 - How far do you think we are from seeing this technology being used in products?

9 - How do you think consumers would react while sharing the world with a new type of moral product package?

10 - What are the ethical goals that you believe CPG companies could pursue when using Augmented Intelligent Reality on their packaging? (This could include consumer psychological goals and/or consumer behavioural goals.)

11 - Which target groups, if any, do you believe would be most effectively addressed with or attracted by AIR packaging? What would be the benefit?

12 - How do you think that AIR strategies for packaging could influence the morality within our social spaces? (For example, the principles on which one's judgments of right and wrong are based, Social and Environmental Sustainability, Social Responsibility, or addressing any other Societal Issues)

13 - How do you think this design concept could be improved to make the interaction between consumers and products even better?

14 - Besides technological issues, what risks, difficulties or obstacles would you see in implementing AIR packaging? (For example, legal issues/risks, resistance by or necessary collaboration with retailers, practical issues in programming the system or designing the packaging or character, consumer disinterest etc.)

15 - To finalize, is there anything else or question you have to ask me?

Closing phase:

Thank you so much for your invaluable help during this interview and for all the clear answers that you provided. You were very helpful, I hope you found it interesting.

I will stop the recording now.

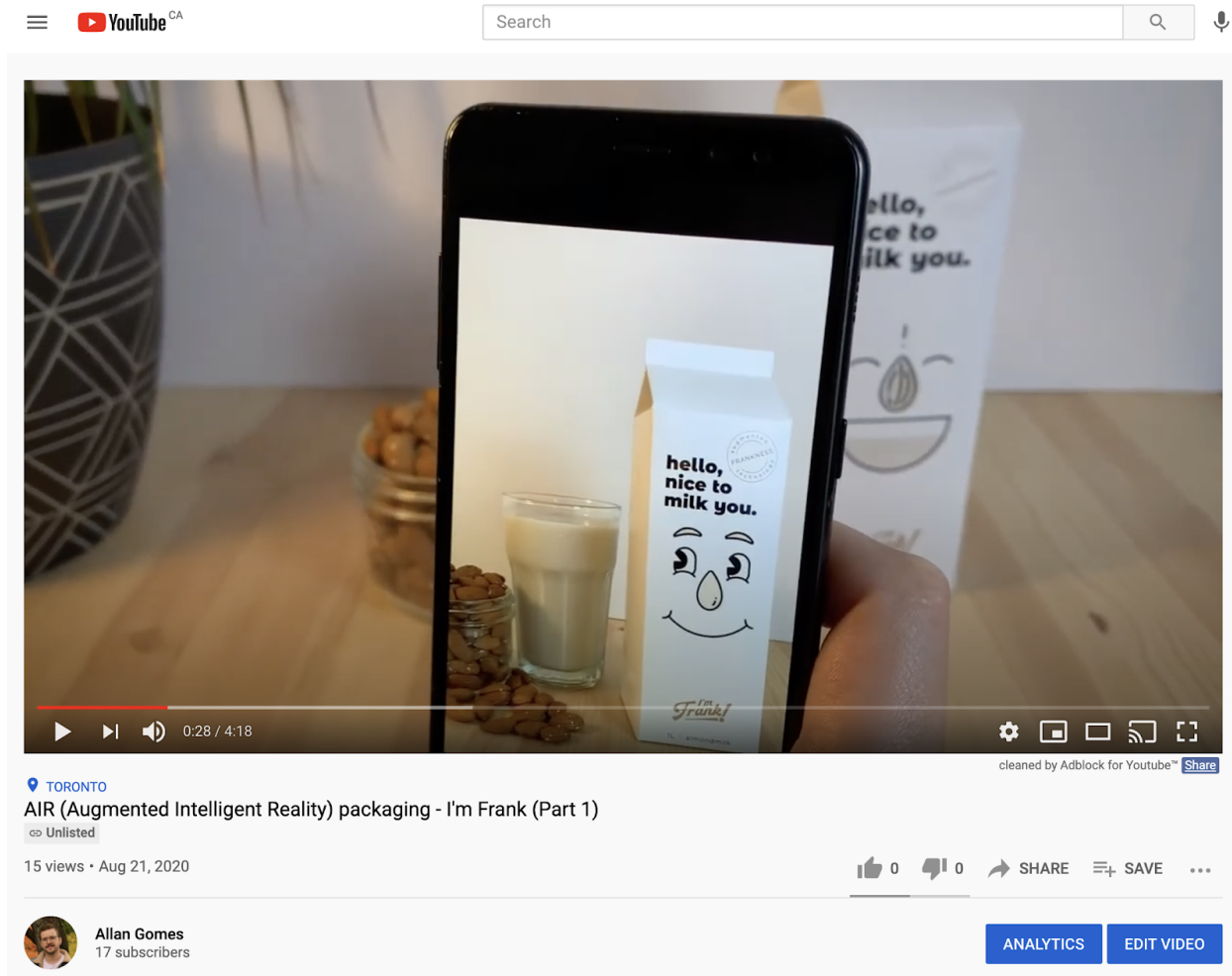
See you, bye.

Appendix C

First Video-simulation - *AIR packaging*.

Video available at:

<https://youtu.be/KC-dTeNj4IE>



Gomes, A. (2020, August 21).

AIR (Augmented Intelligent Reality) packaging - I'm Frank (Part 1) [Video]. YouTube.

Appendix D

Table 1: *List of participants.*

Acronym Participant	Professional Position	Business Segment	Company/Institution Name
P01	President & Founder	Design - Retail Experience	Shikatani Lacroix Design (SLD)
P02	Vice President of Marketing	Marketing - CPG Food Packaging	Tetra Pak
P03	Key Account Director & Marketing Director	Marketing/Sustainability - CPG Food Packaging	Tetra Pak
P04	Cluster Portfolio Director	Portfolio Management - CPG Food Packaging	Tetra Pak
P05	Marketing, Innovation & Renovation Expert	Marketing - CPG Food Division	Anonymized (Multinacional Food & Beverage Company)
P06	Senior Brand Manager	Marketing - CPG Beverage Division	The Coca-Cola Company
P07	Project Manager, Packaging and Graphics	Design - CPG Beverage Division	Anonymized (Multinational Beverage Company)
P08	Canada Research Chair	Philosophy of Moral & Social Cognition - Artificial Intelligence	York University

Appendix E

Word Cloud - Created with Wordle by using the interview transcripts, Participant 03.

CREATED WITH WORDLE - MAXIMUM WORDS: 150 - ORIENTATION: HORIZONTAL
FONT USED: GOUDY BOOKLETTER - COLOUR PALETTE: CUSTOMIZED.



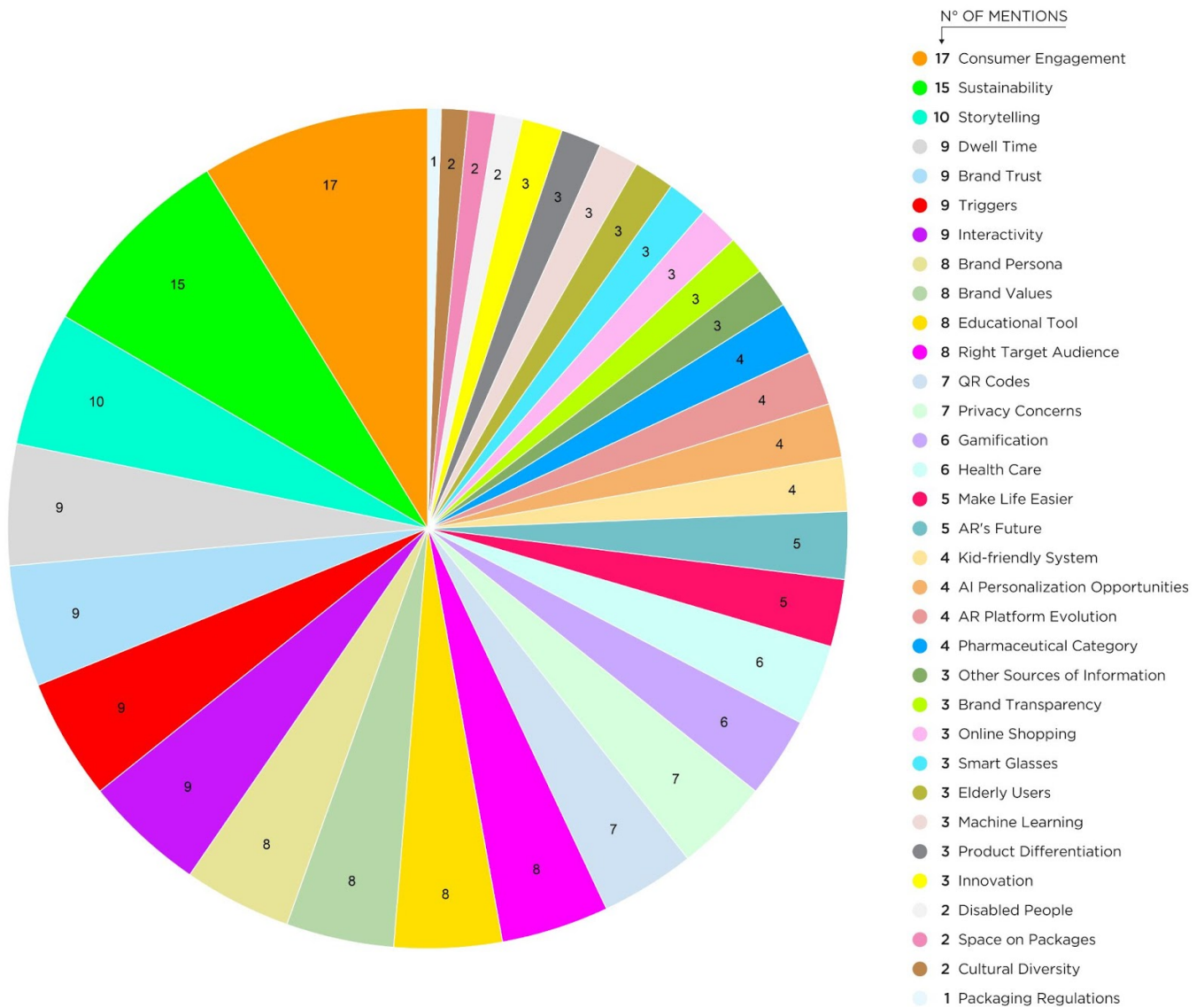
Appendix F

List of Codes - *Organizational structure of all predefined and emergent concepts identified.*



Appendix G

Pie Chart of Codes - *Identifying the most discussed topics during the interviews.*



Appendix H

Brainstorm of Names - *Words reinforcing the concept of transparency and honesty.*

Let's be Frank
HONEST GOODS
 SO FRANK!
 TO BE FRANK WITH YOU
 SPEAKING FRANKLY
 let's be FRANK
 FRANK GOODS
 TO BE FRANK WITH YOU
 FRANKLY
 FRANK & COOL
 TO BE FRANK WITH YOU
 SO TRUE!
 IT'S COOL TO BE GOODS
 TO BE FRANK
 FRANK IS THE NEW COOL
 HONEST IS THE NEW COOL
 TRUTHFULLY
 FRANK N' COOL
 I'M FRANK WITH YOU
 FRANK WITH YOU
 I'M FRANK
 TO BE HONEST
 THE TALKING GOODS
 TRULY GOODS
 FRANK-GOODS
 I AM FRANK
 TOO HONEST
 LET'S TALK FRANK
 IT'S COOL TO BE GOODS
 I DON'T LIE
 FRANK TALK
 TOO REAL
 THE FRANK GOODS
 THE HONEST GOODS
 JUST BE FRANK
 JUST BE FRANK
 JUST FRANK
 So Frank
 Let's be Frank
 Just be Frank
 So Frank Goods
 THE FRANK GOODS
 THE FRANK GOODS
 So Honest
 Frank Goods
 Let's be Frank

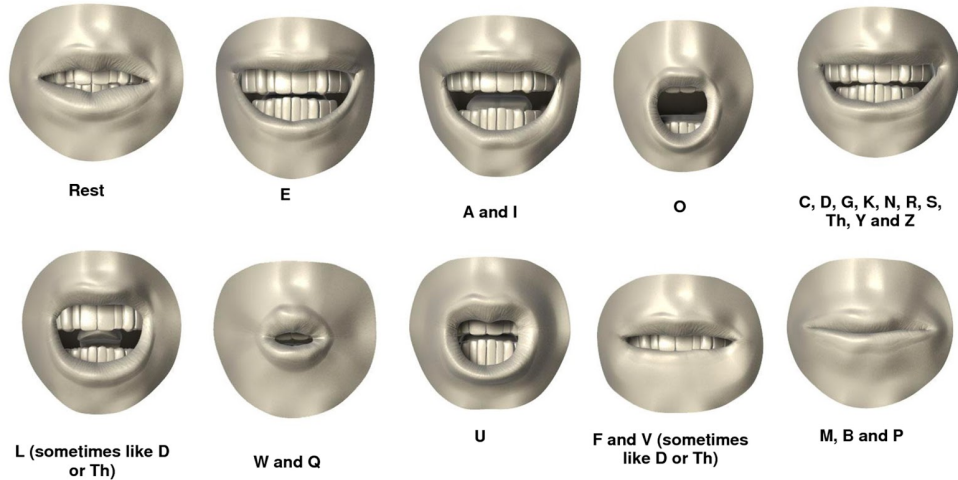
Appendix I

Character Illustration - *Creative process exploring different styles for the character's face.*



Appendix J

References of Phoneme Mouth Shapes:



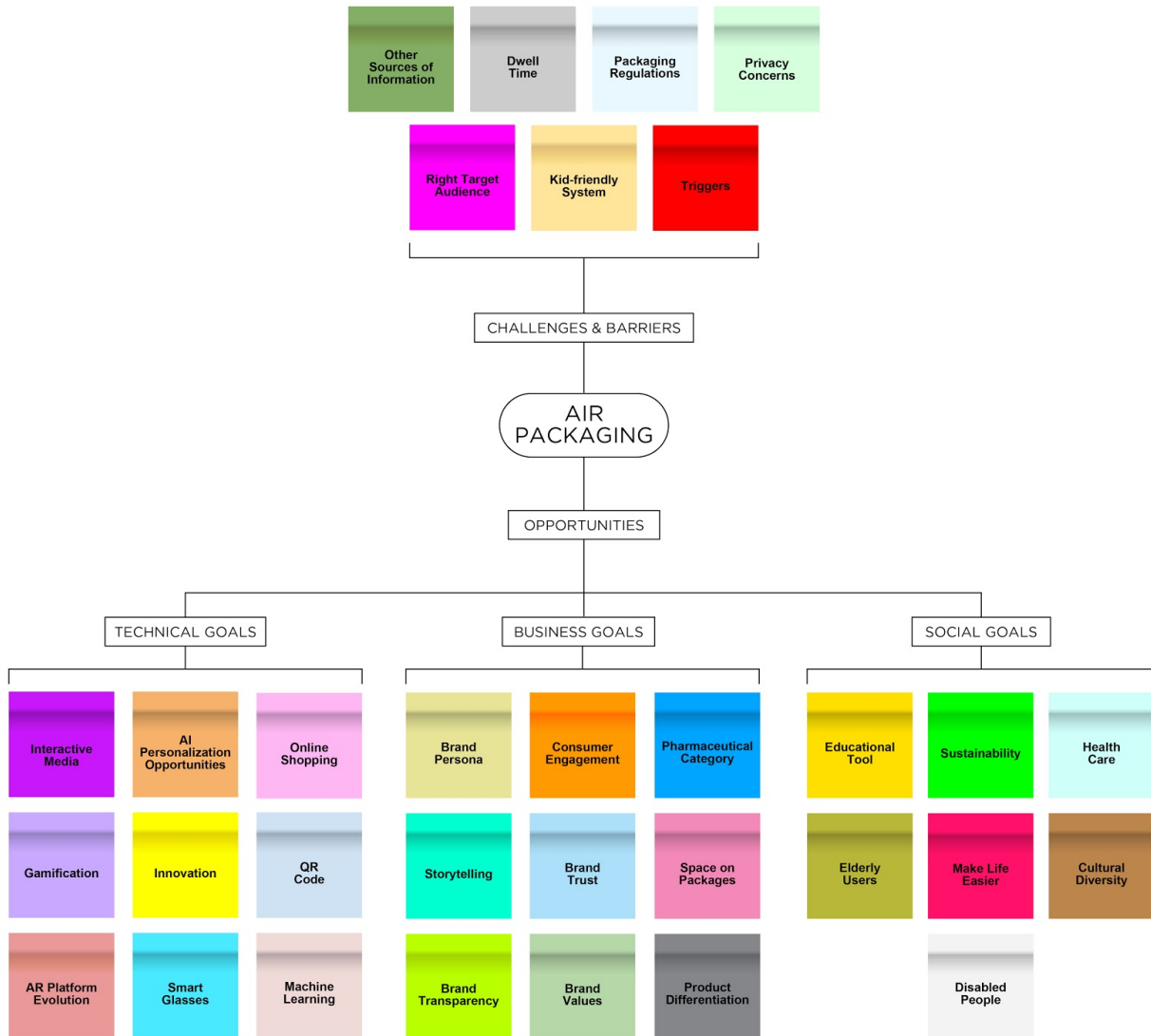
a. 10 basic mouth shapes for animation by Gary C. Martin (2018)

Phonetic Symbols	Sounds	Photos	Drawings
æ, eɪ	at, and, ate		
ʊ, ɜ, ə, r ɜ	look, bird, supply, red		
ɑ, ʌ, aɪ	dog, cut, ice		
ɛ, ɪ	end, it		
i, j, s, ʃ z, ʒ	eat, yes, so, show, zoo, vision		
u, oo, w	you, no, were		
b, m, p	but, man, pet		
tʃ, t	chat, tea		
d, g dʒ, k, n, ŋ	dim, go, jog, king, new, sing		
ð, l, θ	the, lie, think		
f, v	fat, view		

b. Phoneme Chart by TheEndIsNearUs (2015)

Appendix K

List of Codes by Theme - *Organizing all the codes by categories.*



Appendix L

Table 2: Opportunities identified for the improvement of the AIR packaging concept.

Category	Code	Definition
Technical Goals	Interactive Media	<i>Statements reinforcing AIR's interactivity and/or suggesting changes to enhance the interactivity, such as buttons, images, videos, etc.</i>
	AI Personalization Opportunities	<i>Statements suggesting ideas on how AI-powered systems can promote personalized customer experiences by using recorded data.</i>
	Machine Learning	<i>Statements suggesting how machine learning could be used in parallel with AIR packaging to perform specific tasks.</i>
	Gamification	<i>Statements suggesting the application of game-design elements and game principles to encourage engagement and interactivity.</i>
	Online Shopping	<i>Statements reinforcing the rapid way in which online commerce is changing and/or how this change can affect AIR.</i>
	Innovation	<i>Statements pointing out AIR packaging as an innovative concept.</i>
	QR Code	<i>Statements reinforcing the use of QR codes in packages to enable connectivity with smartphones.</i>
Business Goals	AR Platform Evolution	<i>Statements reinforcing future developments and trends of AR platforms.</i>
	Brand Persona	<i>Statements highlighting how great was the exploration of brand persona in the study.</i>
	Consumer Engagement	<i>Statements highlighting how certain features of the system can be changed to increase user engagement level.</i>
	Storytelling	<i>Statements pointing out AIR packaging as an excellent tool for storytelling.</i>
	Brand Trust	<i>Statements pointing out how AIR packaging can increase the levels of brand trust.</i>
	Space on Packages	<i>Statements emphasizing the limited space for information in packages and how AIR packaging can be used to expand it.</i>
	Brand Transparency	<i>Statements describing how brand transparency can benefit companies and society.</i>
	Brand Values	<i>Statements pointing out how AIR packaging can promote brand values.</i>
Social Goals	Product Differentiation	<i>Statements pointing out AIR packaging as an excellent tool for product differentiation.</i>
	Pharmaceutical Category	<i>Statements suggesting how AIR packaging can be beneficial if used for pharmaceutical products.</i>
	Educational Tool	<i>Statements emphasizing how AIR packaging can be used as an educational tool.</i>
	Health Care	<i>Statements suggesting how AIR packaging can be integrated with the health system.</i>
	Sustainability	<i>Statements involving sustainability topics in general.</i>
	Elderly Users	<i>Statements pointing out how AIR packaging can benefit elderly users.</i>
	Make Life Easier	<i>Statements emphasizing how AIR packaging can make people's life easier/better.</i>
	Cultural Diversity	<i>Statements pointing out how AIR packaging can promote cultural diversity.</i>
	Disabled People	<i>Statements pointing out how AIR packaging can benefit elderly users.</i>

Appendix M

Table 3: *Challenges and barriers identified to implementing AIR packaging.*

Category	Code	Definition
Consumer Adoption	Dwell Time	<i>Statements drawing attention to the average time (dwell time) that consumers would spend interacting with the packaging.</i>
	Triggers	<i>Statements drawing attention to what trigger points would encourage consumers to connect and interact with the package.</i>
	Other Sources of Information	<i>Statements drawing attention to the fact that users have many choices to seek information about products, and perhaps AIR packaging would not be the first option.</i>
	Right Target Audience	<i>Statements pointing out that identifying the right target audience is essential to avoid failure in the marketing strategy.</i>
Ethical Issues	Packaging Regulations	<i>Statements drawing attention to the fact that the Government heavily regulates food and beverage packaging for health and safety reasons.</i>
	Privacy Concerns	<i>Statements drawing attention to consumer data privacy concerns, such as how the system will collect, store and use their personal information.</i>
	Kid-friendly	<i>Statements pointing out that the system should be safe for children.</i>

Appendix N

Brainstorm of Phrases - *Exploring puns for the front panel phrase.*

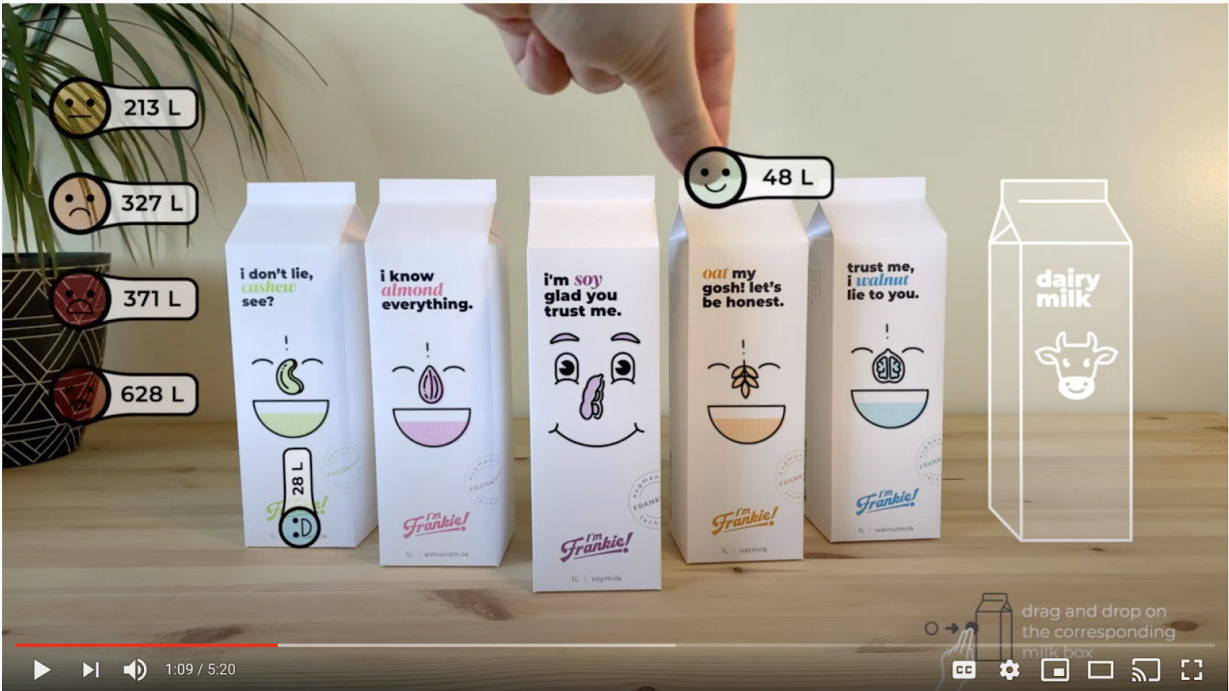
nut	seed	almond	oat	soy
<p>hello, be nuts about me.</p> <p>hello, i'm nuts about you.</p> <p>hello, are you nuts about nature?</p> <p>hello, let's be nuts about it.</p> <p>hello, are you nuts about me?</p> <p>you'll never see nuttin' like me.</p> <p>i love to go nuts!</p> <p>i have nuttin' to worry about.</p> <p>i'm a nutorious packaging.</p> <p>did you nutice me here?</p> <p>i'm plant, nuttin' else.</p> <p>there's nuttin' to hide here.</p> <p>nuttin' is hidden from you.</p> <p>there's nuttin' to add here.</p> <p>there's nuttin' being hidden here.</p>	<p>hello, you must seed it.</p> <p>hello, you should seed this.</p> <p>hello, long time no seed.</p> <p>hello, nice to seed you.</p> <p>hey, come seed this.</p> <p>hey, it's nice to seed this.</p> <p>hey, let's seed each other.</p> <p>hey, let's seed this together.</p> <p>hey, i can seed you there.</p> <p>belive me you'll sucseed.</p> <p>Let's think outseed the box.</p>	<p>i'm ST almond perfect.</p> <p>all monde likes to talk.</p> <p>hello, alright monday.</p> <p>hey, almond forgot to say.</p> <p>hey, let's meet almonday.</p> <p>i highly recalmond</p> <p>hey, let's stay c-almond</p> <p>i know almond everything.</p> <p>i'm almond perfect.</p> <p>i'm almond good.</p> <p>i'm almond there.</p> <p>i can tell almond everything.</p> <p>i'm organic, so i'm almond there.</p> <p>it's almond true that i'm good.</p>	<p>oat my godness.</p> <p>oat boy, i got so much to tell you.</p> <p>the truth is oat there. (out)</p> <p>oat right, let's be honest.</p> <p>oat my god! let's catch up.</p> <p>oat my god! you should know that.</p> <p>oat my god! let's be friends.</p> <p>oat really? i'm good, trust me.</p> <p>oat sh*t! you should know that.</p> <p>oat sh*t! you should know that.</p> <p>oat great! you should know that.</p> <p>oat my god! let's be frank.</p> <p>oat my god! let's be straight.</p> <p>oat gosh! let's be frank.</p>	<p>i'm soy perfect.</p> <p>i'm soy happy to meet you.</p> <p>i'm soy glad you trust me.</p> <p>i'm soy glad to be here.</p> <p>that's soy true.</p> <p>i'm soy grateful that you trust me.</p> <p>i'm soy glad you trust me.</p>
cashew	rice	coconut	walnut	
<p>my honest will cashew. (catch you)</p> <p>i'm not milk cashew you see?</p> <p>i'm not milk, cashew see?</p> <p>i'm nuts! cashew see?</p> <p>i don't lie cashew see?</p>	<p>have a rice day</p> <p>hello, rice to meet you.</p> <p>a rice against time</p> <p>it would be rice to meet you.</p> <p>it's rice to tell you the truth.</p>	<p>hey, let's go coconuts.</p> <p>i'm coconuts about the truth.</p> <p>i love to go coconuts.</p>	<p>i walnut lie to you.</p> <p>you can trust me, i walnut lie.</p> <p>i walnut deceive you.</p> <p>walnut tell you the truth?</p> <p>we're walnuts about the truth.</p> <p>trust me, i walnut lie to you.</p>	

Appendix O

Second Video-simulation - *AIR packaging*.

Video available at:

https://youtu.be/kTh_-K0NV0U



AIR (Augmented Intelligent Reality) packaging - I'm Frankie (Part 2)

Unlisted

No views • Feb 27, 2021

Allan Gomes
17 subscribers

ANALYTICS EDIT VIDEO

Gomes, A. (2021, February 27).

AIR (Augmented Intelligent Reality) packaging - I'm Frankie (Part 2) [Video]. YouTube.