

# Green Packaging : A Step towards Sustainable Development

Reena

reena3006.singh@gmail.com

DPG Degree College, Gurugram

## Abstract:

Making packaging more sustainable has garnered increasing interest over the past 20 years from all relevant parties (government, businesses, and consumers). One of the most environmentally friendly materials on the market is paper. 60 participants took part in focus group sessions that were organised in two rounds as part of a qualitative study that examined customers' expectations and perceptions about sustainable paper-based packaging materials. Participants in the first stage discussed their perspectives on the packages that are currently on the market as well as their expectations for a sustainable packaging material. They assessed five paper-based prototype packages for two product categories (biscuits and meat) in the study's second phase. The main concerns for present products were excessive plastic use and over packaging. The two key factors influencing consumers' buying intentions were price and quality. Although the prototypes' sustainability impressed the participants, they weren't entirely satisfied with the design and weren't willing to pay more for a more eco-friendly box. The "3Rs"—Reduce, Reuse, and Recycle—should be the primary factors to consider when creating a sustainable package, according to the major message that came out of the conversations.

**Keywords:** paper-based packaging, consumers, focus groups, sustainability, environmentally friendly

## INTRODUCTION

It is impossible to overstate the importance of packing for the secure delivery and transit of goods along the food chain. A good food package should guarantee that food quality and safety are maintained from transportation through product storage in order to reduce food loss and waste [1]. However, a significant drawback of packaging is that it increases global environmental impact because it is always thrown away right away once the product is used [2]. Paper (including cardboard), wood, glass, metal, and various types of plastics are the principal materials used to package food.

Governments, businesses, and consumers have all shown an increasing interest in packaging sustainability during the past 20 years.

Sustainability and methods for making packaging materials more environmentally friendly were the subject of recent packaging research [3,4]. According to life-cycle assessments (LCAs), sustainable packaging is described as having a relatively low environmental impact [5]. A

sustainable package, however, can be defined as "a packaging design that evokes explicitly or implicitly the eco-friendliness of the packaging" [6] for the ordinary consumer.

Consumer perception of paper as a high-value and environmentally friendly material has led to a comeback of paper as a packaging material [7,8,9]. Paper has the benefits of being recyclable, biobased, and degradable. Paper-based packaging has a substantially lower environmental impact than packaging made of many other materials, according to studies from the Institute for Energy and Environmental Research (Germany). Paper-based packaging has the ability to reduce the environmental impact of packaging and combat marine trash globally. Given that the amount of packaging used is continually rising as a result of tiny portion packaging, urbanisation, and a rising global population, this is particularly important.

There are several options for more paper and less polymer in food packaging, but the technology must be adjusted to the production process and the material composition must match the product specifications. Paper packaging options are expanding, and issues with barrier characteristics and formability are being addressed.

Although life-cycle analyses (LCAs) highlight the sustainability benefit of packaging, marketing success depends on knowing how consumers view and perceive these containers. This is so because LCA results [7,10] do not determine customer perceptions and beliefs about a package that affect choice and purchase.

Consumers, who choose whether or not to purchase the products, are largely responsible for the success of ecologically friendly packaging [11]. A thorough grasp of consumers' thoughts and perceptions of ecologically friendly packaging is required [2] in order to promote customer acceptance and purchase of sustainable packages.

Only 21 of the 46 studies included in a recent review by Ketelsen et al. [11] were concerned with consumer reactions to environmentally friendly packaging, indicating that this field of study is not particularly thoroughly investigated and highlighting the need for additional research in this area.

While some prior research [12,13] concentrated on the impact of sustainable packaging on perceived product quality, others [6,13] concentrated on the impact of design and labelling components on customer perceptions of ecologically friendly packaging. In their investigation of how 321 Canadian consumers reacted to environmental information, Ertz et al. [13] found that well stated environmental claims and labelling signals on product packaging improved customers' perceptions of the quality of the product. However, the perception of product quality was not significantly improved when an environmental label was absent from comprehensive self-declared environmental claims.

Studies [9,14,15] have been done on consumer knowledge of the environmental effects of food packaging. There is currently no information about environmentally friendly characteristics on packages, and participants in focus group discussions and a survey in Italy looking at labelling information on packaging expressed a strong desire to learn more about the sustainable aspects of

the packaging [15]. Steenis et al. [9] observed that having sustainability cues on packaging was a crucial element in influencing how packages differed as rated by university students in the Netherlands in their study on consumer responses to packaging design. Consumers in South Africa had limited understanding of what environmentally friendly packaging is, how to distinguish it from other packaging, and what advantages different packaging had, according to a study by Scott and Vigar-Ellis [16] on consumer understanding, perceptions, and behaviours in relation to environmentally friendly packaging. Labels, pictures, and logos were cited by South African customers as the key qualities that made it easy for them to recognise packaging that was environmentally friendly. The type of packaging used and its colour were additional criteria for evaluating package sustainability.

Previous research on consumer desire and willingness to acquire items with ecologically friendly packaging has mixed findings [17,18,19,20,21,22]. One-third of the consumers who took part in the study agreed that the environmentally labelled packaging was one of the most crucial factors in their decision, according to Rokka and Uusitalo's study [17], which compared green packaging with a number of product attributes and how these attributes affect consumers' environmental choices. Among Polish and French students, Jerzyk [22] investigated the characteristics of sustainable packaging that have a beneficial impact on consumer behaviour and how purchasing intentions can be modified when the packaging is sustainable. Students are not willing to give up any of the useful or high-quality features of the products because of the products' sustainable nature, they claimed, and sustainable packaging is not the most significant consideration when purchasing a product, because the packaging is environmentally friendly. It has been demonstrated that environmental awareness and religious convictions affect consumers' intentions to buy eco-friendly packaging. Previous research revealed that environmentally conscious consumers are more likely to purchase sustainable packaging [23,24,25,26]. Studies [6, 7, 16, 22, 26, 27, 28] tended to concentrate on environmentally beneficial packaging in general as opposed to specific packaging solutions. However, only a small number of research concentrated on particular packaging for certain items, such as paper packaging for cereal bars [13], glass packaging for foods [21] and milk [29], and different packaging materials for tomato soup products [9]. This demonstrates how little is known about customer reactions to particular sustainable packaging alternatives. In order to gain a deeper knowledge of customer perceptions and the acceptability of particular solutions, Ketelsen et al. [11] suggested that future research should concentrate on specific packaging solutions rather than environmentally friendly packaging in general. In the past, research approaches such as focus groups, questionnaires, and interviews have been employed to examine customer insights. Several authors employed focus groups, which are typically used at the beginning phases of consumer research since they have the main advantage of allowing participants' freedom of expression and open conversations [30,31,32]. In light of this, the study's goals were to: (i) comprehend how consumers perceive the food packaging that is currently available; (ii) design sustainable paper-based packages for meat and biscuit products based on consumer opinions and expectations of sustainable paper-based packaging over a series of participatory focus group sessions; and (iii) comprehend how consumers felt about the paper-based

packages that were developed as well as evaluate and assess the characteristics and suitability of each package.

## Material & Methods

Consumer input was supposed to be incorporated into the design of the paper-based products through a series of qualitative participatory focus group workshops. To do this, the study was divided into two stages, the first of which was to determine what consumers generally expected from sustainable paper-based products, and the second of which involved evaluating prototype packages created using the data and results from the first stage.

## Procedure

Focus groups were held in a discussion room with participants sitting comfortably around a table so they could see each other and engage in meaningful conversation. Each focus group session was comprised of 6–8 participants, evenly split in terms of age according to standard practises for conducting focus groups [30], with two-thirds of the group being female due to the higher proportion of girls to males who participated in the study. The moderator provided an overview, explained the goal of the study, and described his or her responsibilities at the start of each session. There were no right or wrong answers to the subjects being discussed, and participants were invited to express their ideas. The discussion was led by a pre-approved semi-structured focus group guide. Two researchers moderated the focus group sessions, with one taking notes while the discussions ran for about two hours. For additional research, all sessions were audio- and video-recorded and verbatim transcribed.

2.1.1. Stage 1 Nine focus groups with a total of 60 participants were held. Participants were asked to introduce themselves and explain what they typically recycle in order to encourage relationships, get to know one another better, and get them thinking about the issue that would be discussed. The group's thoughts about the current food packaging options on the market were solicited before the discussion began. The expectations for and potential drawbacks of using sustainable packaging materials were then discussed. The discussion of factors to be taken into account while purchasing a product was then requested for. The participants were shown two of the currently available items (a meat package and a biscuit package; see Figure 1). They were instructed to open, handle, and debate the benefits and drawbacks of the gifts. The proposed sustainable paper-based packaging material samples were then shown to the participants (Figure 2), who were then asked to comment on the materials' qualities. The willingness of participants to purchase or pay more for sustainable packaging was the last question posed to them.



Figure 1

Examples of currently available packages discussed in Stage 1: (a) B0: Biscuit package; (b) M0: meat package.



Figure 1

Examples of new paper-based packaging materials discussed in Stage 1.




2.1.2. Stage 2 For the second stage of the study, a total of eight focus group meetings were held with a total of 56 first stage participants. Participants had to assess the paper-based packages that had been partially created using their input from Stage 1 in this stage. Participants were shown the new paper-based prototype packaging one at a time and asked to give their thoughts on them in terms of the design, substance, etc. The next step was to ask participants to discuss if the packages matched their expectations for a sustainable packaging material and the advantages and disadvantages compared to the packages that are currently available on the market. They were then asked to rate how simple it was to separate the packaging film or barrier from the environmentally friendly components of the packaging. Finally, they were questioned about their intention to purchase the products and how the amount of sustainable material used in the packaging would affect their choice. Five additional paper-based prototypes in total were created and debated throughout the session: two for the meat products (Table 1) and three for the biscuits. The paperboard tray has the lowest climate change impact when compared to plastic crystalline polyethylene terephthalate (CPET) trays and recycled plastic recycled polyethylene terephthalate (rPET) trays, according to the results of a life cycle assessment (LCA) done on the paper-based trays with polyethylene terephthalate (PET) coating. A life cycle analysis screening was done for the meat packages, and it revealed that the expanded polystyrene (EPS) (M0) tray has a higher

environmental effect than the new paper-based packaging if it is not recycled (assuming the paper tray is recycled ten times).

The study's participants came from all throughout Berkshire, UK. Utilising the general mailing list of the University of Reading as well as the volunteer databases of the Sensory Science Centre and Nutrition Unit of the Department of Food and Nutritional Sciences at the University of Reading, UK, recruitment emails were sent out. Posters for advertisements were put up on different social media sites, at neighbourhood stores in Reading, UK, and on notice boards inside the University of Reading, UK. A screening tool for eligibility was required for potential participants.

Table 1

Biscuit and meat packages discussed in Stage 2.

Code	Packaging Description	Image
Biscuit packages		
B0	Preformed polymer multicavity tray, polymer flow pack (horizontal)	
B1	Form-fill-seal paper-based tray with paper-based lidding film and smooth tray surface	
B2	Form-fill-seal paper-based tray with paper-based lidding film and embossed surface	

Meat packages

Meat packages M0 Preformed polymer tray with polymer lidding film with opening flap

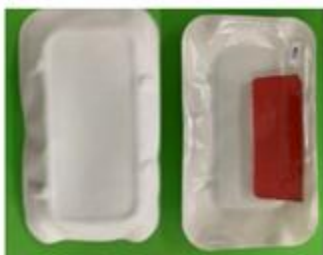


M1 Preformed paper-based tray with polymer lidding film identical to M0 with more depth and



transparent polymer lidding film

M2 Form-fill-seal paper-based tray with polymer lidding film, smooth tray, and less depth with transparent polymer lidding film



M3 Form-fill-seal paper-based tray with paper-based lidding film, embossed tray bottom and non-transparent paper-based lidding film



Participants in the study had to meet the following requirements in order to be considered: over the age of 18; not allergic to or intolerant of wheat, gluten, and/or dairy; interested in food packaging; and available to participate in both phases of the study. The School of Chemistry, Food, and Pharmacy Research Ethics Committee, University of Reading, UK, approved the study (study

number: 11/19), which took place between April and November 2019. Prior to the focus group meetings, all participants gave their informed consent.

Table 2 lists the demographic details of those who participated in the study. Stage 1 of the study involved 60 people in total, while Stage 2 involved 56 persons again. Women made up 66.7% of the competitors in Stage 1. 95 percent of the study's participants said they were concerned about the environment.

**Table 2**

Demographic characteristics of focus group participants.

Participant Characteristics	Stage 1		Stage 2	
	Number	Percentage (%)	Number	Percentage (%)
Total number of participants	60		56	
<i>Age (years)</i>				
Mean	47		47.6	
Median	49		49	
Min	19		19	



Participant Characteristics	Stage 1		Stage 2	
	Number	Percentage (%)	Number	Percentage (%)
Max	71		71	
<i>Gender</i>				
Male	20	33.3	16	28.6
Female	40	66.7	40	71.4
<i>Ethnicity</i>				
Asian/mixed Asian	11	18.3	8	14.3
Black African/Caribbean/Mixed	2	3.3	2	3.6
White British	39	65.0	39	69.6
White other	8	13.3	7	12.5
<i>Environmentally conscious</i>				

Participant Characteristics	Stage 1		Stage 2	
	Number	Percentage (%)	Number	Percentage (%)
Yes	57	95.0	53	94.6
No	3	5.0	3	5.4

### Data Analysis (2.3)

Using content analysis, the session notes and transcribed data were examined. The process utilised was comparable to that of [31]. Two researchers independently identified reoccurring themes from the focus group transcripts, and they then compared their findings to produce a summary of the main findings. A result had to be discussed in at least four out of nine sessions (Stage 1) or eight sessions (Stage 2) in order to be included [31,33].

### Results 3.

Although the participants in the focus groups examined each package separately, the findings of the conversations are presented by summarising common themes that emerged. To demonstrate how the participants thought about some of the subjects, some remarks from the discussions are presented.

#### 3.1. Stage 1

3.1.1. Views on the Packages That Are Currently on the Market The quantity and kind of food packaging were the key topics brought up by the participants in every session. One participant said, "You don't need to have individual wrappings for everything," and another asked, "Why have a wrapping around a coconut?" Participants complained that there was excessive packaging and over packaging of items, most of which is unnecessary. The usage of black trays and single-use plastic packaging was brought up as the second issue: "Why use plastic except [when] absolutely necessary?"; "the amount of plastic being used is excessive." There is far too much plastic being used, which is frightening. Some participants claimed that the justification offered for excessive packing was to safeguard the food for consumers, who demand this because they are concerned

about contamination. The packaging is there to benefit the stores, not the planet or the consumer, according to several participants who stated that consumers are continually being told that, but questioned whether this is what consumers actually want or what supermarkets need. Another concern that emerged repeatedly throughout the focus group sessions was confusion over how to handle packages with additional knowledge required: "The majority of people are unaware of how recycling works and whether or not packages need to be washed before being disposed of in the recycling bin? Clearer manufacturer instructions on how to dispose of packaging are required. More general means of disposing of packaging are required. Glass is not necessarily more sustainable because the cost of production for recycling glass is 80% higher than using fresh products, according to some participants who felt that glass was more environmentally friendly than plastic packaging. However, others countered that the production process of glass actually makes it less environmentally friendly. The need for complete transparency in the packaging process was expressed by participants, who said that "we don't have the whole story" and that "consumers need information on things like the carbon footprint of packaging materials."

Participants generally agreed that there needs to be a cultural shift, consumers need to be more flexible with their requests regarding how foods are packaged, manufacturers need to change consumer attitudes and perspectives, and governments need to introduce laws that will force consumers to adapt by reducing the amount of packaging used. The UK government's ban on free plastic bags was cited as an example of how the government can influence consumer attitudes. Participants noted that more people now bring their reusable bags (bags for life) with them when they go shopping, which has sharply reduced the amount of plastic bags being used. In conclusion, attendees concurred that the "3Rs"—Reduce, Reuse, and Recycle—must be the motto to make food packaging more ecologically friendly and sustainable.

3.1.2. Factors to consider Purchasing a Product Participants cited price as the primary determining factor in their purchasing decisions, followed closely by the quality of the item, with statements like, "For me, the quality of the product is at the forefront if I am buying anything, and then I consider whether I can afford it." The majority of the participants said that they gave the product's packaging little thought while making purchases. The majority of folks claimed that they didn't think about that till they arrived home. Few consumers responded that sustainability of the packaging material was a factor in their decision-making, with the majority saying that they thought about sustainability of the packaging only after making the purchase and that it was not a factor at the point of purchase. Participants also highlighted personal preference, habit, the amount of time available for shopping, and whether or not there were other alternatives. "I sometimes try to find products in more sustainable packaging, but sometimes they are not available," and "I sometimes try to find something in a glass instead of plastic because I feel glass is more sustainable, but sometimes you don't have a choice." It depends on how much time I have; if I had enough time, I would look around for products packaged in a sustainable way, but if I didn't, I would just shove things into my basket without thinking about how they are packaged. However, sometimes they are not available, and because I need it urgently, I end up buying anything I see.

Many others agreed, saying, "It depends on the cost; if loose fruits were slightly more expensive than fruits packaged in a plastic bag but within my budget, I would buy the loose fruits, but if they were over my budget, I would buy the packaged fruit"; "when I go for my weekly shopping, I generally go for brands I am used to within my budget."

Expectations from a Sustainable Packaging, section 3.1.3 The primary themes cited by participants when asked to outline expectations from a sustainable package were functionality in terms of maintaining product quality (such as freshness) and shelf life: Durability: "It should be strong, stress-resistant, and able to keep the product intact without splitting or breaking until I get to my destination"; Aesthetic value: "The design should be very attractive and stand out from other less sustainable packages"; It should do its job of keeping the product safe and maintaining its quality. Must be recyclable or biodegradable: "A sustainable package should be easy to recycle and would be better if it was 100% recyclable"; "There is no point in me buying an attractive package if it is not recyclable"; The bare minimum of packaging should be used: "do not over package products; use just enough packaging required to maintain product quality and safety." There is no use in me purchasing a nice package if it is not recyclable. A crucial problem raised was the requirement for packaging to bear a clear sustainability label.

Opinions on the Biscuit and Meat Packages That Are Currently Offered Talked About in the Study Participants were shown a meat and biscuit packaging that is currently on the market (Figure 1) and asked what they thought of the products. Instead of presenting the results based on individual packages, the themes that emerged from the conversations were used to organise and present the results. The packaging material, design, size, utility, and labelling emerged as major themes. Participants gave both favourable and negative feedback.

Participants made remarks about the biscuit package's flimsy outer wrapper and the fact that it was made of foil-like material, which was seen negatively. They said things such, "the wrapper rips up easily" and "oh you've got foil." The biscuit's packaging, a black plastic tray, was criticised and described as very typical. The majority of participants did not appreciate the way the meat was packaged in polystyrene, including the disposable plastic top; "this packaging is not recyclable." Because neither the meat nor the biscuit packaging can be recycled or reused, they were both deemed to be environmentally detrimental. Several recommendations were given regarding how to make the packaging more environmentally friendly, with remarks like: "Instead of the black plastic tray, the cookies may be in a cardboard box" and "Polystyrene! "Why not use paper packaging with a window on the lid so the product is visible to consumers?" and "Can't it be cardboard? "Package function vs. products inside" was another key subject. The biscuit package, according to participants, was not very practical and did not maintain the product's quality: "the package is not protecting the biscuits; there are too many broken biscuits in my pack"; "package is too loose." The meat package's functionality received little to no feedback from participants, but there were many comments about the labelling, many of which related to the size and content of the label: "label occupies too much space covering the product and making it not visible to the consumer"; "disposal information not visible enough"; "label should be more visible"; "different signs on the label is very confusing and unclear". Participants believed that both packages were

"over-packed/over-wrapped" and unfriendly to the environment. They also believed that the volume of the meat box might be reduced by up to 40%.

### 3.2. Stage 2

The following topics came to light after the paper-based package prototypes (Table 1) were assessed and contrasted with the older, existing packages: appearance, material characteristics, design and size, usefulness, target market/population, and price/purchase intent.

**3.2.1. Material Characteristics of Packaging** The three key aspects of packing materials that were discussed were appearance, strength, and feel. Comments such as "quite attractive—catches the eye" and "looks classy, like a quality product" were made regarding the B2 prototype box's appearance, which were described as more appealing and favoured than those made about the B1 packaging. However, when describing package B1, phrases like "looks cheap and unappealing" were used. Participants thought the present biscuit package (B0) was more appealing than both B1 and B2 when compared to the prototypes. B2. When examining the design of the meat packets, prototypes M2 and M3 received more favourable reviews than M1, which was characterised as "looking very basic in a good way," "cheap and unattractive," and "shocking!" Participants favoured the existing meat packing (M0), just like they did with the cookie packaging, saying things like "it looks neater than the others." However, one compliment on the prototype meat packaging was that it appeared more natural and eco-friendly than M0.

Participants evaluated the B2 package as "more sturdy" than the B1 package as "very flimsy" during discussions on the strength of the packages. "More rigid and stronger" was how B2 was described in comparison to B0. The "most rigid" of the three prototype packaging for the tray strength of meat was claimed to be M3, whereas M1 and M2 were described as being "very flimsy" and "less sturdy" than M3. Participants commented that the M1 and M3 lids were "stronger" and "won't tear easily" in comparison to the M3 lid, which they considered "may be easy to tear compared to the other ones," during the discussion of the three prototypes' lid strengths. Participants viewed the M0 packaging as "looking easily breakable" and "not as strong as the paper packages."

The feel of the parcels was the last mentioned quality. Participants preferred the cardboard-like feel of all the meat and biscuit paper-based prototypes in general. Participants claimed that the "bumpy" feel of package B2 provided it a "better grip" and made it easier to hold than B1, although the smooth feel of package B1 was favoured. One participant said, "Feels cheap—don't like it" when describing how B1 feels. People have said things like "feels natural" and "has a homemade feel, like something from the butchers" when describing the paper-based meat packets.

Design and Size.2.2 All of the prototype packages for meat and biscuits were deemed to be excessively large in comparison to the amount of product they held. Participants felt that the size of B0 was perfect and appropriate for the number of biscuits it held, while they felt that M0 was too large for the amount of meat it contained. "Definitely a waste of space," "why use so much packaging," "the fact that it is supposed to be a more sustainable package doesn't mean it should be this big," and "what a waste!" have all been said about the paper-based containers. In addition, participants felt that the design of biscuit packages B1 and B2 needed to be changed since it was "not deep enough" and limited the quantity of biscuits that the packages could hold. Participants thought the packages were excessively large, saying things such, "Packaging probably cost twice as much as the biscuits." While participants praised the design of the M3 package and said that the M2 package "looks like a proper tray—with less packaging," they disliked the form of the M1 package because they thought it was "too big," "funny," and "not well-defined." Participants praised the paper-based prototypes' lightweight design, suggesting that it would be simple to carry because of its modest weight.

In terms of design, people enjoyed and preferred the white and red colour contrast of packages B1 and B2 over the "all red" colour of B0. Participants also favoured B1 and B2's foldable pack designs over B0's flat design, while some thought it would be best to divide the two packs because they considered the double pack design to be highly confusing. The "bumpy" shape of B2 was preferred over the "smooth" appearance of B1, nevertheless. Participants who discussed the meat packets thought all three prototypes—M1, M2, and M3—were overly basic. Discussions on the meat packages' lids revealed that participants disliked M3's opaque paper lid because it prevented them from seeing the package's contents.

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praised the paper-based prototypes' lightweight design, suggesting that it would be simple to carry because of its modest weight.

3.2.3. Usefulness In comparison to B0 and M0, all paper-based prototype packages were reportedly quite challenging to open. Just like in M0, it was suggested that "a side flap and indicator for opening" be included to the design to help customers decide where to open the packages. Participants noted that B2 was a little bit simpler to open than B1 for the biscuit packages, which they attributed to the tray's "bumpy" aspect making it firmer to hold. The participants perceived the difficulty of opening the packages as a positive in that they believed it indicated the packages were tightly sealed, boosting their preservation qualities and making them more stress-resistant. Due to their rigidity and folding shape, B1 and B2 packaging were said to provide the biscuits with better protection than B0. Participants claimed the B2's "bumpy" design provided greater protection than the B1's smooth one. However, participants found it challenging to open both packets, and they regarded it unacceptable when most splits led to broken cookies and opened seals. It was proposed that single packs would be more practical overall and superior to pair packs. Participants were concerned about contamination in M1, M2, and M3 containers. They worried that, unlike in M1 and M3, the M2 lid was touching the goods and could cause contamination. Concerns were raised over the products' safety inside the paper-based packaging. Comments like "what happens when it gets wet or soggy?" were made regarding the protection of the items inside the paper-based packages if they became wet due to rain or cold storage in the case of the meat packages.

Participants judged the barrier in the M1, M2, and M3 packages to be very functional in protecting the product, despite their concerns about its sustainability. To varied degrees, participants found it challenging to separate the paper material from the barrier of the paper-based products. While M2 was the most challenging to separate from the meat packages, B2 was easier to separate than B1 for the biscuit packages. Participants made it clear that they did not want to be responsible for separating the barrier before discarding the item, though. For example, "it is a hassle," "trying to separate the barrier in the meat package can lead to contamination," and "if I am eating the biscuit on the go, you cannot expect me to be here," are some of the excuses provided.

"You cannot expect me to separate the barrier if I am eating the biscuit on the go." Participants believed that the new prototypes' shape and design were not very functional for the products because they resulted in excessive packing with nothing within. They recommended altering the design of the biscuit containers to a rectangle, which would decrease the amount of packing while increasing the quantity of biscuits within. It was suggested that B0's black plastic tray design be kept, but that the plastic be swapped out with a tray made of paper. Participants stated that the inability to reseal the paper-based prototype packages after opening was a crucial feature lacking from them. Some suggested that for storage, the lid should be made resealable.

3.2.5 Price/Purchase Intent A significant topic that came up during the conversations was price/purchase intention. B1 and B2 were not viewed as better values than the B0 bundle, with many participants stating that they would likely only purchase them once. Participants admitted that they were generally not tempted to purchase the biscuits in the new paper-based packaging,

but they did suggest that the duo pack be divided into two packs and sold separately to increase the purchasing value. Several participants made the comment that it would be preferable to divide the two packs because they believed this would increase sales. The M2 package was regarded as offering good value for the money, however M1 was deemed unfit for market introduction. Participants were more inclined to purchase the M2 and M3 packages, preferring the M2 due to its transparent top, but they were reluctant to purchase the M1 box. In terms of purchase intent, participants were generally unwilling to pay more to be sustainable, similar to Stage 1 participants, but some were happy to pay "5 to 10%" more for the new sustainable paper-based packages, primarily because they disliked the polystyrene in the M0 package and the black plastic tray of the biscuit package.

## Conclusion

This study deepens our understanding of customer reactions and perceptions of environmentally friendly paper-based packaging. The study's findings highlight important consumer perceptions of a sustainable paper-based package in the UK population, but we acknowledge that results may vary with a larger sample size or a different demographic in the UK or in other regions of the world due to cultural and regional variations in consumer perceptions of sustainability. Focus groups have reportedly been described as a useful tool for learning about consumers' perspectives on various topics, which may subsequently be analysed in the future using a more quantitative methodology [8]. The findings of this study demonstrate that the study's participants (i) are aware of how food packaging affects the environment, (ii) are concerned about how unsustainable packages affect the environment, and (iii) want to see a change in the kind and quantity of materials used in food packaging. This study supports the notion that customers' purchasing intentions are still primarily influenced by price and quality. The paper-based packets tested in this study were disliked by the participants, while the biscuit design was thought to be intriguing and novel. Participants generally felt that the paper-based products fell short of their expectations, although they all concurred that the design was going in the right direction. Using 130 people, a quantitative analysis was carried out to verify the findings of this investigation. A quantitative investigation with 130 individuals was undertaken with results that agreed with those of this study to validate its findings [49]. In conclusion, the "3Rs"—Reduce, Reuse, and Recycle—should be the primary factors to consider while creating a sustainable package, and this was the main message that came out of the conversations. If success is to be accomplished, all parties (the government, manufacturers, and consumers) must undergo a cultural transformation.

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