

Summary of the revised thesis of Hugo Elderson

Kumasi is a company that sells fruit juice that is made from the juice of squeezed cacao fruit, mixed with water and additives. They currently package their drinks, both still and sparkling, in aluminium cans. They are looking to innovate their packaging method in order to appear more sustainable and stand out to consumers among other options. In order to achieve a smaller and more light-weight product they are willing to sell the fruit juice concentrate with additives, leaving the task of mixing with water to the consumer. This would make the package more sustainable, because there is less product to package, thereby reducing the overall material usage and weight of the package. This would also decrease the carbon footprint of the product by reducing the cost of logistics.

Besides the requirement to make a light-weight package, there were a few additional needs that a package would have to fulfill in order to be viable. These wishes and needs were organized based on the stakeholders that consider them important: the consumers, the company and the environment.

The most important things to consider for the consumer were the quality of the drink, the visual appeal of the package, the perceived sustainability of the package and the ease of use. First and foremost the package must preserve the quality of the drink. This means that the drink cannot spoil, discolor or lose taste when it is packaged. The visual design and “language on the label” are among the most influential factors that (US) consumers consider when shopping (Shorr, 2020). This visual design and language must also convey the sustainability of the package to the consumer. There exists some confusion among shoppers as to which materials are truly sustainable and which are not (Boesen, 2018). Therefore the need is phrased as “perceived sustainability”; the consumer needs to understand why this package is good for the environment, or better than some alternatives.

Kumasi simply wants the package to be as cheap as possible, without compromising on these other requirements of course. This need covers the cost per unit of the package, as well as overhead or upfront costs such as storage, logistics and costs to purchase machines etc. if necessary.

The environmental needs were as follows: The package should emit as few greenhouse gasses throughout its lifecycle as possible, should contain as few ingredients that are toxic to the environment as possible, and should be easy to recycle. That last need only applies to packages that are meant to be recycled.

These needs were then translated into measurable, quantifiable requirements. The most relevant among these were the following:

- Oxygen must not be able to permeate through the material in order to preserve quality
- The material used must be approved for food contact
- The package must not weigh more than 50 grams
- The package must not cost more than €0.20

The decision was made to try to create a package made from biodegradable or compostable materials. While the recycling rates for plastic bottles and aluminium cans are high, this is

mostly because of the deposit system that the Netherlands uses. Smaller packages made from plastic would not fall under this system and so they run a risk of not being disposed of properly. After this some visual ideation was performed in order to generate different shapes, sizes and opening mechanisms. The latter was a focal point especially because it would determine to a large degree both the way the consumer would use the package, the oxygen barrier of the package and the cost of production. Ideally the opening mechanism would include few additional components, be easy to use and understand while still preserving the contents of the package.



The final design was a “straw” made of bamboo-PLA-composite, compostable material. This material is suited for annealing. It is food-safe and ample rigid. The straw will be sealed on one side by heating it and pressing it, hence why the material must be suited for annealing. Then it is filled with the syrup and sealed in the same way on the other side. The straw is wrapped with a paper-based sticker to allow for branding and food information. The straw is opened by pressing on the top to crack the material. The paper sticker will have an indent to allow for this breaking, as well as make sure that both halves of the package stay together for the convenience of the user. This design was evaluated based on the requirements laid out earlier and found to be the optimal choice.

In order to properly evaluate the viability and likelihood of success of this package it was compared to the aluminium cans that Kumasi uses right now. Unfortunately, the aluminium is cheaper and the package itself (without the liquid) still weighs less than the concept proposed. Although aluminium is not compostable or biodegradable, it is very easy to recycle. The Netherlands recently introduced a deposit system for aluminium cans, which is expected to boost recycling rates to great heights. The only drawback for the cans is that it is less marketable. It does not stand out to the consumer and it is not perceived as more sustainable than any other options (Boesen, 2018). Consumers may be more inclined to purchase the conceptual package if they are very environmentally minded. However, in lieu of a proper Life Cycle Analysis, at this time it is uncertain if it actually *is* more sustainable. However, in lieu of a proper Life Cycle Analysis, at this time it is uncertain if it actually *is* more sustainable.

SOURCES

Shorr Packaging (2020) The 2020 Food Packaging & Consumer Behavior Report.

Retrieved from <https://www.shorr.com/resources/blog/2020-food-packaging-consumer-behavior-report/>

Boesen, S., & Bey, N., & Niero, M. (2018) Environmental sustainability of liquid food packaging: Is there a gap between Danish consumers' perception and learnings from life cycle assessment? *Journal of cleaner production* vol. 210.