A Multi-User Experience Data-Driven Design Support Framework: A Sustainable Smart Take-Away Food Packaging Case Study

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In early design, designers must make important but uninformed decisions based on limited knowledge, due to large amounts of unstructured data. As a result, they risk developing products which are rejected by life cycle stakeholders. To increase the product's impact, designers must understand the needs of potential users, but with the added endeavour of balancing functional, sustainability, and market requirements, this poses challenges to designers. By adopting smart sustainable food packaging as a case study, this research extends on previous work to identify strategies employed in designers' practices. Smart packaging enhances traditional packaging's basic functions by meeting emerging consumer expectations for quality and sustainability through novel technologies. Smart packaging acceptance relies on user values, and given the multi-stakeholders involved, their consideration in design allows for food packaging to evolve towards new advancements that are more mindful of their requirements. Studies with the multi-users of food packaging revealed their needs, and established framework requirements that seeks to support the development of innovative products which enhance multi-user experiences. Hence, the overall research goal is to address the gap in design support systems, which inspired the generation of the SUSTAIN-MULTI-UCD framework. The contribution lies in employment of data-driven approaches to gather diverse user data to help enhance multi-stakeholder experience, such as the application of topic modelling and text classification. This research focuses on providing a knowledge-based framework applied in the early design stages to capture multi-user requirements, and lay the foundation for concept generation.