



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

## Project brief

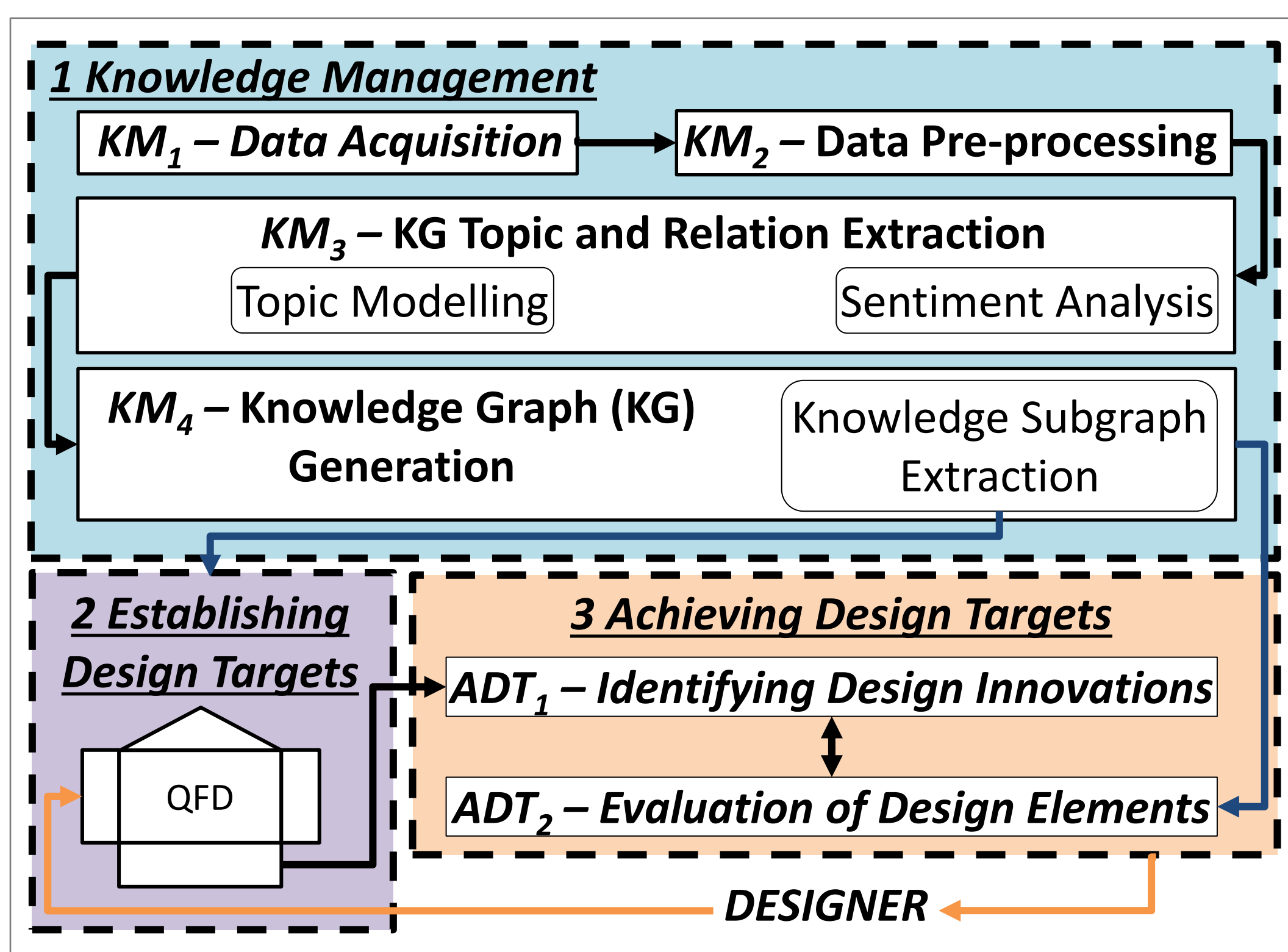
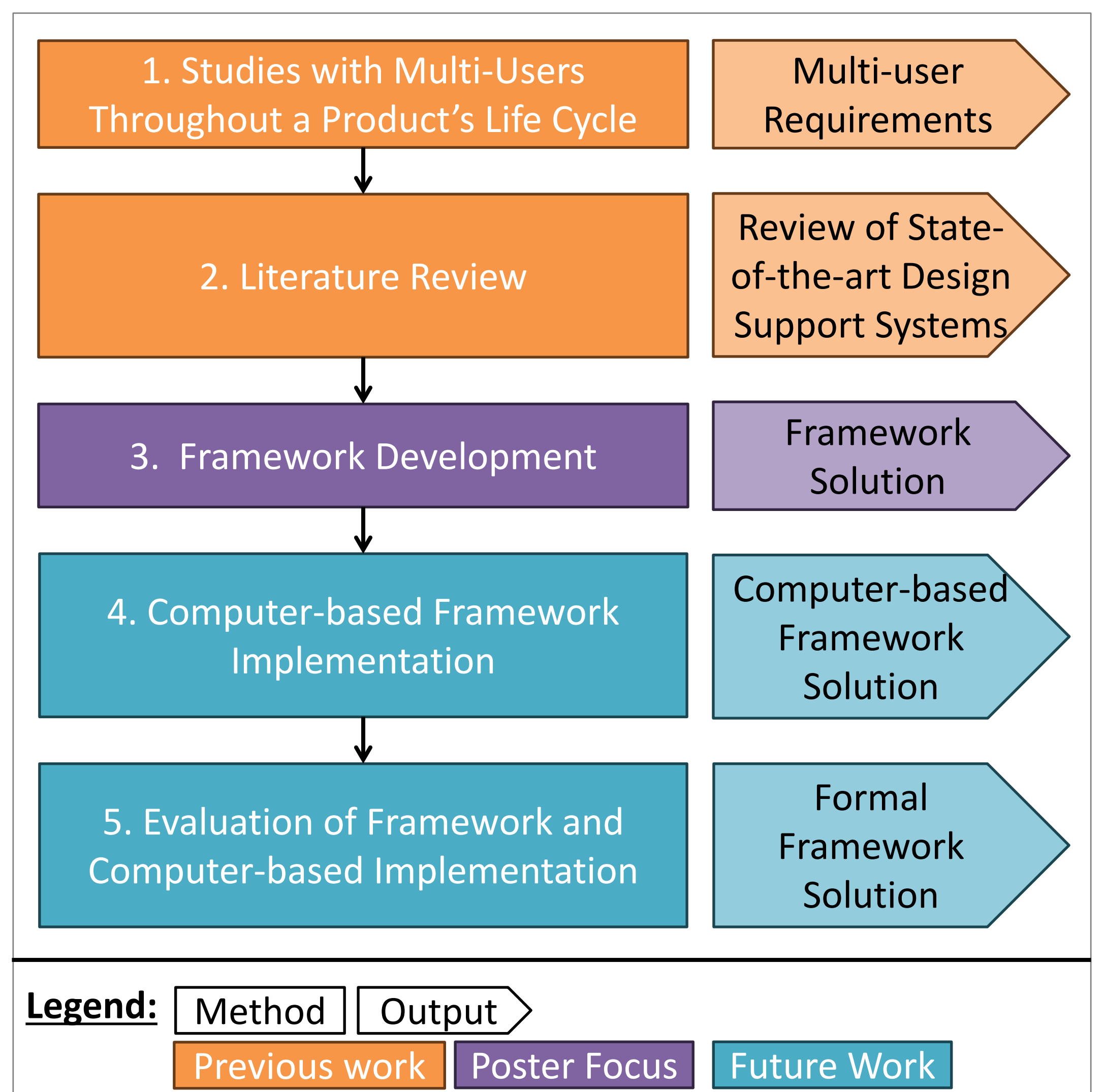
### Aims & objectives

Effective design is becoming necessary to shorten product development times to meet evolving user demands. Thus, it is essential that designers uncover user requirements and translate them into tangible product specifications, but with the added endeavour of balancing functional and sustainability requirements, this poses challenges to designers. In early design, designers must make important decisions based on limited knowledge, risking developing products which are rejected by users. A literature review determined that no available system is sufficient to balance multi-user requirements and design characteristics, so the goal is to address the gap in design support systems.

## Methodology

### Tools & prototypes

Fifteen semi-structured interviews with food packaging designers were conducted in Stage 1 of methodology, aimed at determining whether designers require support to capture the multi-user profile in early design, and if so, the areas in which they require support. The framework requirements established in this study were used as a basis for a literature review (Stage 2). Based on this, the proposed framework was developed (Stage 3). Additionally, studies with multi-users were conducted in Stage 1, to understand their perceptions of take-away food packaging. The knowledge gathered from these studies will be used to model the framework in an eventual computer-based implementation proof-of-concept tool in Stage 4. The validity of the framework will be tested through evaluation by designers in Stage 5, and based on their feedback, the formal solution will be developed.



## Results & conclusions

### Results & prototypes

The contribution lies in the *PR*ioritising and *ACH*ieving *M*ulti-user *RE*quirements (*PRIMED*) knowledge-based framework applied in the early design stages. In Frame 1, topic modelling, sentiment analysis, and conflict resolution techniques are applied to capture knowledge on multi-user needs, and product design aspects. This knowledge is utilised in Frame 2, to prioritise multi-user and design requirements, and translate them into product specifications by means of a QFD. Then, *PRIMED* identifies innovative design aspects to fulfil the established design targets (Frame 3). A case study of smart and sustainable packaging is considered to highlight the framework's applicability.