

DECISION SUPPORT SYSTEM FOR SUSTAINABLE PACKAGING DESIGN

CONTEXT

The challenge owner is a solution provider that focuses on digitalising enterprise operations to enhance companies’ operational efficiencies. They offer a proprietary solution that enables data-driven decision-making by monitoring and identifying machine performance matrix, optimising manufacturing costs for their clients.

Sustainable packaging has emerged as a vital area in addressing the environmental impacts associated with conventional packaging practices in manufacturing of Fast Moving Consumer Goods(FMCG). Due to the recently implemented regulations for packaging reporting (i.e. Mandatory Packaging Reporting, MPR), challenges around waste generation, resource depletion, and climate change are surfacing and the need to adopt alternative eco-friendly packaging has become increasingly urgent. Sustainable packaging prioritises environmental responsibility, resource efficiency, and circular economy principles which aim to reduce carbon footprint and minimise resource depletion while meeting the evolving needs of businesses and consumers. Life cycle assessments, taking into account environmental impacts from sourcing and manufacturing to transportation, use, and end-of-life disposal, provides a holistic perspective that guides decision-making towards more sustainable packaging solutions.

Currently, packaging is designed to outlast its contents and after usage, often becomes waste. Thus, sustainable packaging design with emphasis on reducing environmental impact is increasingly being explored. However, the company is facing challenges due to:

- Manufacturers have limited knowledge about sustainable packaging design (e.g. eco-friendly packaging materials, end-of-life planning for the packaging)
- Lack of decision support system that considers both environmental and economic aspects for providing alternative material selection and end-of-life planning for packaging without compromising its functionality and properties.

This sector-wide challenge is supported by the Advanced Remanufacturing and Technology Centre (ARTC), as part of the A*STAR Advanced Manufacturing Startup Challenge 2023, focused on the theme of “Sustainability”. ARTC is led by the Agency for Science, Technology and Research (A*STAR), in partnership with Nanyang Technological University Singapore. ARTC’s expertise in advanced manufacturing and remanufacturing accelerates the transfer of innovation from applied research to industrial applications and solutions, building capabilities through collaboration with their industry members. A*STAR aims to catalyse startup challenge winners to co-innovate and co-deploy advanced manufacturing solutions through ARTC's consortium.

PROBLEM STATEMENT

How might we provide decision support to help the company to achieve sustainable packaging design without compromising its functionality?

WHAT ARE WE LOOKING FOR?

The challenge owner is looking to develop a solution that is able to support decision making in the exploration of environmentally sustainable packaging designs.

The solution should meet the following criteria:

- Material selection. Tacit knowledge and know-how for material selection encompassing packaging functional requirements such as product safety, durability, sustainability and branding requirements.
- Structural Design. Ability to come up with different packaging designs that fulfil functional requirements such as handling and transportation requirements, mechanical strength and stability requirements and user requirements. Able to incorporate aesthetic requirements into design.
- Prototyping and Testing. Able to build prototypes or 3D mock-ups of packaging designs using alternative materials and test whether design fulfils packaging and usability requirements.
- Integrated with Industry knowledge. Packaging design domain expertise including industry trends, materials, design techniques and regulations. It should be able to augment the knowledge base to create innovative and relevant designs based on the functional requirements of the packaging.

OVERALL PERFORMANCE REQUIREMENTS

- Easy to use. Intuitive and user-friendly interface.
- Future-proof. The solution should consider possible new materials and manufacturing technologies and be updatable to capture new and upcoming potentials.
- Integration with existing platforms (optional). If the prototype is successful, the solution could potentially be incorporated with the challenge owner’s existing Optipedia¹ platform to allow their existing clients to explore sustainable packaging design

There are no restrictions on the geographical location of the problem solvers who may choose to apply to this challenge. However, the prototype must be demonstrated in Singapore.

POSSIBLE USE CASES

1. Company adopting sustainable packaging design. Cecilia has been tasked to update her company’s product packaging to be more sustainable. With this solution, she is able to receive information and recommendations to allow her to explore potential alternative materials that have a lower environmental impact, uses the least amount of packaging material necessary, reducing packaging waste and optimising space during transportation. Alternative end-of-life pathways are also analysed and explored. She is able to create a design that takes into account all the various considerations to meet her company’s needs.
2. Ease of prototyping and testing. Paul has to decide on the company’s new packaging design and he has a few options to choose from, each with their pros and cons. With this solution, he is able to easily build prototypes or 3D mock-ups of each design to expedite the testing process in order to make a faster and more informed decision.

WHAT'S IN IT FOR YOU

- SGD50,000 of prize money for each winner of this challenge (see Award Model)
- Access to IMDA’s innovation consultancies (e.g. Design Thinking, Digital Storytelling, UI/UX) and PIXEL corporate innovation hub (e.g. hot-desking, project studios, ARVR, usability, 5G test labs) for prototyping and commercialisation
- SGD150,000 A*STAR Innovation Voucher and 2-year ARTC Membership

¹ Optipedia is an online collaboration platform between supply chain partners that share processes and information to achieve mutually beneficial goals. It helps manage the multiplication of relationship and touchpoints to improve business performance in product development, new product introduction, sourcing and manufacturing functions, and coordination and planning of resources and processes.

- Shortlisted 3 Grand Winners of the Startup Challenge 2023 to be fast tracked to ESG’s SLINGSHOT Top 50 and can look forward to SGD30,000 Startup SG grant
- Opportunity to commercialise solution for deployment and adoption by ARTC members

EVALUATION CRITERIA

The evaluation process shall take place over two stages. Proposals shall be evaluated based on the evaluation criteria set out for the first stage. Thereafter, shortlisted proposals shall be subjected to a second stage evaluation in the form of an interview / pitch, and the scoring shall be based on a re-defined assessment criteria for the selection of the challenge finalist(s).

Solution Fit (20%)	<u>Relevance</u> : To what extent does the proposed solution address the problem statement effectively?
Solution Readiness (40%)	<u>Maturity</u> : How ready is the proposed solution to go to the market? <u>Scalability</u> : Is there any evidence to suggest capacity to scale?
Solution Advantage (20%)	<u>Quality of Innovation</u> : Is the solution cost effective and truly innovative? Does it make use of new technologies in the market, and can it potentially generate new IP?
Company Profile (20%)	<u>Business Traction/Model</u> : Does the product have user and revenue traction? Is the company able to demonstrate financial capabilities and resources to complete the prototype? <u>Team Experience</u> : Do the team members possess strong scientific/technical background?

AWARD MODEL

30% of the prize money will be awarded to each selected finalist at the start of the POC/prototype development process. The remaining 70% will be awarded after completion of the POC/prototype solution, based on milestones agreed between Problem Owner(s) and the solver. Prize money will be inclusive of any applicable taxes and duties that any of the parties may incur.

Note that a finalist who is selected to undertake the prototype development process will be required to:

- Enter into an agreement with Problem Owner(s) that will include more detailed conditions pertaining to the prototype development;
- Complete an application form with IMDA that will require more financial and other related documents for potential co-funding support.

Teams with public research performers are required to seek an endorsement from their respective Innovation and Enterprise Office (IEO) and submit the IEO form together with the proposal.

DEADLINE

All submissions must be made by **11 August 2023, 1600 hours (SGT/GMT +8)**. Problem Owner(s) and IMDA may extend the deadline of the submission at their discretion. Late submissions on the OIP, or submissions via GeBIZ, will not be considered.