Exercise 4d.2: Applying the Circularity Calculator

Estimated time requirement: 30 minutes

Introduction

"What gets measured, gets done" is a popular management mantra. While the origins of this saying are debated, it is of utmost importance for contemporary management education. In fact, literature is teeming with management handbooks which provide ample advice on how to measure, monitor and evaluate business or product performance. In 2015, the British home improvement company Kingfisher launched a project to develop an indicator which would allow to capture the circularity performance on a product level. Based on the resulting indicator system, researchers from the University of Bath, United Kingdom, developed a circularity calculator.[1]

After completing this exercise, you will be familiar with the methodology and different aspects of the circularity calculator. You will also be able to describe strengths and limitations of the tool.

Structure of exercise

Part	Task	Time
1	Please form groups of up to 2-3 people and examine the two case studies on the next page. Use the information on the Circularity Indicator system presented in table 1 and score both products based on the product descriptions below. Enter your scorings in table 3 on Worksheet 1.	20 min
2	Discuss the following questions in your group and note your findings on the flipchart. Guiding questions: • Does the methodology capture all necessary circularity aspects and if not, which aspects are missing? • Are the weightings (max scores) adequate or how should they be changed? • Which of the criteria did you find most difficult to assess and why?	10 min

[1] Source and further information: https://iris.unive.it/retrieve/handle/10278/3688992/104510/Int_J_Sustainable_Eng_06_2017.pdf

Background information

The indicator system is comprised of a number of variables along a product's lifecycle. In order to assess a product's performance, each variable is assigned with a guiding question and is measured on a weighted scale. Overall, a product can score a maximum of 152 points, indicating highest circular performance. Using this weighted scale, the indicator system is somewhat more **qualitative** in nature as it requires experts' inputs in order to translate a product's performance into a measurable format. Table 1 presents the indicator system including its weighting and guiding questions.

Table 1: Circularity Indicator

Lifecycle stage	#	Guiding question	Max. Score
Design	1	Is the product made from recycled/reused material?	20
	2	Is the product lighter than its previous version?	2
	3	Is there a complete bill of materials and substances for the product?	5
Production	4	Is there a complete bill of energy for the manufacturing process?	10
	5	Is there a complete bill of solid waste for the manufacturing process?	15
Commercialization	6	What packaging is being used?	5
	7	What is the product's warranty?	10
	8	Is there a rental option for the product?	15
In use	9	Can the usage status and identification of the product be established?	15
	10	Can the product be repaired?	5
	11	Can the product be reused?	10
	12	Does the product help to reduce waste through its use?	5
End-of-life	13	What take-back scheme is available for this product?	15
	14	Is the product separated out from other products at the end of its life?	10
	15	Are the product's materials passed back into the supply chain?	10

Marudhar Caffeinated Caps Pvt. Ltd. is a fictional producer of coffee capsules based in Kalinganagar, Odisha. The company was established in 2011 and has quickly become a market leader, supplying customized single-use coffee capsules to global players in the foodstuffs industry (e.g. Mestlé). By adopting an ambitious Corporate Social Responsibility strategy, Marudhar Caffeinated Caps has embarked on a mission to continuously improve the quality of their products, increase material efficiency and reduce impacts on the environment. As part of its research and development program the company has recently launched a reusable coffee capsule. A detailed comparison of the disposable "Chug'n'Chuck" and new "KeepCap" capsules is presented in table 2.

Table 2: Comparison between “Chug’n’Chuck” and “KeepCap” capsules

	“Chug’n’Chuck” capsules	**“KeepCap” capsules**
		
Design	The disposable capsules are made from 100% virgin multi-layer plastics. Coloured coatings are used to distinguish and market different types of coffee (e.g. Cappuccino, Espresso). Marudhar Caffeinated Caps approached their suppliers of coatings agents to identify the types of substances used in the production of different colours. After two years of consultations and discussions, the suppliers submitted a bill of substances, however, without specifications about the exact formula.	The outer shell accounts for 35% of the total product weight and is made entirely from recycled stainless steel. The sieve-cap and inner shell are made from virgin stainless steel. The rubber sealing is directly sourced from an organic farm in Tamil Nadu. A complete bill of materials used can be found on the company’s website.
Production	The capsules are formed by thermoforming multiple layers of plastics to 1.25 mm thickness. Solid waste production and energy consumption is monitored on a company level. A material flow analysis indicated that material losses of 5% (waste) occur during the manufacturing process, mainly owing to offcuts and occasional quality rejects.	The capsules are formed by applying hydraulic pressure to sheets of stainless steel of 0.75 mm thickness for sieve-cap, outer and inner shells. Since the KeepCap was launched only two months ago, estimations for the generation of solid waste and energy usage in the production process do not yet exist.
Commercialization	Capsules are sorted by colour, stacked in hundreds, bailed in single-use plastics (foil) and delivered to customers where they are filled and sealed. Capsules are packaged in printed cardboard boxes (100% virgin fibres) of 10 and sold to end-consumers via online channels and stores. No warranty is given due to the products’ single-use character.	The components of the capsules (sieve-cap, inner shell, outer shell) are individually wrapped in single-use plastics (LDPE, non-recycled) and subsequently boxed in small carton boxes (100% recycled materials). The product is directly marketed via Marudhar Caffeinated Caps’ online shop and retail outlets. A warranty of one year on heat-induced deformations to the outer and inner shell is provided.
In use	Marudhar Caffeinated Caps are made for singular use and replace previous coffee making practises such as filter coffee. The company has no further information about the use phase of the product.	The product is designed to be long-lasting and reusable, serving at least 2,500 individual coffee servings throughout its lifetime. Marudhar Caffeinated Caps has no further information about the use phase of the KeepCap. However, contact details of customers ordering via the company’s online shop are available. In case of damage, the products individual components (outer and inner shell, sieve-cap and rubber sealing) can be replaced.
End of life	Since Chug’n’Chuck capsules are entirely made of plastic, they are subject to Extended Producer Responsibility (EPR) systems across most of the core markets (e.g. through the Packaging and Packaging Waste Directive in the EU). This includes the obligation of collection and, in some parts, recycling rates (e.g. 70% by 2030 in the EU). After using, the spent coffee ground stays in the capsule and needs to be scooped out manually by the consumer to ensure separation at source.	Marudhar Caffeinated Caps has evaluated the introduction of a take-back scheme but found it too uneconomical due to low volumes and long latency periods in the rate of return. Consumers are not expected to remove the rubber sealing prior to disposal. Most of the KeepCaps core markets are characterised by comparatively well developed collection infrastructure combined with automated separation into metallic and non-metallic fraction. In addition, steel recycling rates in many markets have recently met an all-time high (e.g. 79.5% in the EU).

Worksheet 1

Table 3: Exercise template

Lifecycle stage	#	Max score	Score of "Chug'n'Chuck" capsules	Score of "KeepCap" capsules
Design	1	20		
	2	2		
	3	5		
Production	4	10		
	5	15		
Commercialization	6	5		
	7	10		
	8	10		
In use	9	15		
	10	5		
	11	10		
	12	5		
End of life	13	15		
	14	10		
	15	10		
SUM				