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LINKING INNOVATION AND SUFFICIENCY: REVIEWING THEORY AND PRACTICE

Indra da Silva Wagner, University of Hohenheim
Bernd Ebersberger, University of Hohenheim

The world population is growing and natural resources are scarce.

- Increase in food demand, resource use, waste, and greenhouse gas emissions (WWF, 2022).
- SDG 12: Ensure sustainable consumption and production patterns (United Nations, 2022).
- Demand-side: Sufficiency involves different types of **changes in consumption behavior** that individuals can implement toward sustainability (Sandberg, 2021).
- Supply-side: Producers of goods and providers of services are responsible for actively restricting resource usage and for **influencing consumption patterns** (Jungell-Michelsson & Heikkurinen, 2022).

How are innovation and sufficiency linked from the perspective of firms?

- Most studies conceptualize sufficiency as primarily driven by the demand side (Jungell-Michelsson & Heikkurinen, 2022; Kropfeld, 2022).
- The demand side has to be matched appropriately by sufficiency products and services (Niessen & Bocken, 2021).
- This requires a shift in the literature to move beyond behaviorism towards a more strategic framing (Jungell-Michelsson & Heikkurinen, 2022), highlighting the role of businesses for sufficiency.
- Innovation represents a promising means to alter 'business as usual' (Adams et al., 2016).
- This study investigates **which innovations businesses implement to realize sufficiency by influencing consumers' consumption behavior.**

LINKING INNOVATION AND SUFFICIENCY

Embracing sufficiency at the firm level requires new ways of doing business, for example through:

- Business model innovation (Bocken et al., 2014),
- Frugal innovation (Bocken et al., 2020; Stöber et al., 2023),
- Social innovation (Sandberg, 2021).

Innovation comes in different types:

- Product innovation (goods and services),
- Business process innovation, several variants: such as
 - Organisational innovation
 - Marketing innovation (OECD & Eurostat, 2018).

SUFFICIENCY ENTAILS THE RESTRICTION OF PRODUCTION & CONSUMPTION TO REDUCE THE QUANTITY OF ECONOMIC ACTIVITY OVERALL WHILE MAINTAINING THE QUALITY OF LIFE TO MAXIMIZE BENEFITS FOR SOCIETY AND THE ENVIRONMENT

(DE KEYSER & MATHIJS, 2023; HEIKKURINEN ET AL., 2019).

REVIEWING THEORY AND PRACTICE

Literature analysis – Snowball approach

- Identification of relevant themes, categories, and frameworks from the literature suited to define sufficiency-oriented innovations.
- Current sample: 39 articles

Criterion	Sample inclusion	Sample exclusion
Innovation is linked to sufficiency	There is a direct link between innovation and sufficiency.	Innovation and sufficiency are addressed independently of each other.
Business context	Firm-level innovation as an enabler for sufficiency.	Innovations for sufficiency at the macro/micro level.
Article characteristics	Journal article; German & English; "Sufficiency" & "Innovation" in full text	Other types of articles; other languages; Either "innovation" or "sufficiency" not mentioned

Table 1. Inclusion and exclusion criteria.

Practice review

Analysis of **770 recent (Feb-May 2023) innovations** from a proprietary innovation database to identify sufficiency-oriented innovations (see Ebersberger & Kuckertz, 2021).

Research Goal

Devise an **'Innovation for Sufficiency' (IfS) framework**.

- **Customer Engagement Strategies:** What do these innovations allow the customers to achieve?
- **Archetypes of Innovations:** What is new in these innovations?

EXAMPLES OF SUFFICIENCY INNOVATIONS



Fig. 1
GreenSwapp
(2022).

GREEN SWAPP (NL) – Retail
Scanning tool displays environmental impact of consumer goods.

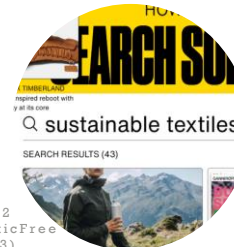


Fig. 2
PlasticFree
(2023).

PlasticFree (UK) – Retail/IT
Platform provides plastic alternatives for textiles, packaging, building, and construction.



Fig. 3
Charity Super.Mkt
(2023).

Charity Super.Mkt (UK) – Retail
Charity fashion store generates money for good causes through sustainable consumption.



Fig. 4
Grow Up
(2023).

Grow Up (USA) – Household Appliance
Nut milk machine for home use allows users to make different types of plant-based varieties of milk.



Fig. 5
New Arctic Kitchen
(2022).

New Arctic Kitchen (DK) – Food
Food movement promotes local ingredients and strengthens regional independence and identity.



Fig. 6
OneThird
(2023).

OneThird (NL) – Food/IT
AI technology predicts the shelf life of fruits and vegetables and thereby helps to reduce food waste.

IFS – CUSTOMER ENABLING STRATEGIES

<p>Improved</p> <p>Adapting existing practices to sufficiency.</p> <p><i>OneThird</i></p>	<p>Different*</p> <p>Applying alternative (new) resources or practices.</p> <p><i>PlasticFree Grow Up</i></p>
<p>Less*</p> <p>Foregoing or reducing certain resources and practices (through new alternatives).</p> <p><i>New Arctic Kitchen</i></p>	<p>Together</p> <p>Sharing or transferring knowledge, resources, or practices.</p> <p><i>Green Swap Charity Super.Mkt</i></p>

IFS – INNOVATION ARCHETYPES

Product innovation

- **Flexible good/service:** Implementing products/services with versatile use cases or as replacements for previous options. *(Different)*
- **Matchmaking good/service:** Implementing goods/services that determine the best combination of demand and supply. *(Less)*
- **Regenerative good/service:** Implementing goods/services that enhance existing operations overall. *(Improved)*
- **Life extension technology:** Implementing technology that identifies the optimal lifespan of products. *(Improved)*
- **Purpose-driven good/service:** Implementing goods/services with direct influence on consumers' lifestyles. *(Together)*

Business process innovation

- **Sufficiency-oriented business process innovation**
Changes in business processes that support sufficiency, such as changes in marketing, organization, communication, production, or innovation.



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THANK YOU.

Indra da Silva Wagner, University of Hohenheim, Stuttgart, Germany | **E: indra.dasilvawagner@uni-hohenheim.de**

Bernd Ebersberger, University of Hohenheim, Stuttgart, Germany

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