

IRPact: An Actor-centered framework for Innovation Diffusion in Integrated Resource Planning

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Complex Adaptive Systems Modeling  Springer

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Abstract

Insights into the diffusion process can help decision makers to detect weak points of potential business models. Yet, due to the multitude of factors to consider, modeling the diffusion of innovations is a very challenging task. In the literature, various models and methodologies to address this problem can be found. Among these, empirically grounded agent-based modeling turns out to be one of the most promising approaches. However, the current culture is dominated by papers that fail to document critical methodological details. Thus, existing agent-based models for real-world analysis differ extensively in their design and grounding and therefore also in their predictions and conclusions. Being aware of this, this research paper seeks to identify requirements as building blocks in order to design and develop a versatile, but robust model to assess innovation diffusion processes. Subsequently, a formal approach is developed based on the derived model entities, dynamics and foundations. The main objective of this modeling approach is to achieve modularity and flexibility, as well as clarity through an explicit description of the concepts used. This is achieved by a three-layer approach, with a super agent layer, an agent layer and a sub-agent layer. Building on this, an object-oriented code base, organized in 24 packages and 273 classes is created. This empirically grounded agent-based modeling framework can be utilized by innovation diffusion researchers in order to build upon existing frameworks and concepts and to model a diverse range of domains in innovation diffusion.

Full Text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed.

However, the manuscript can be downloaded and accessed as a PDF.

Figures

Not provided with this version of the manuscript.

Figure 1

Illustrative interplay of identified model entities, dynamics and foundations.

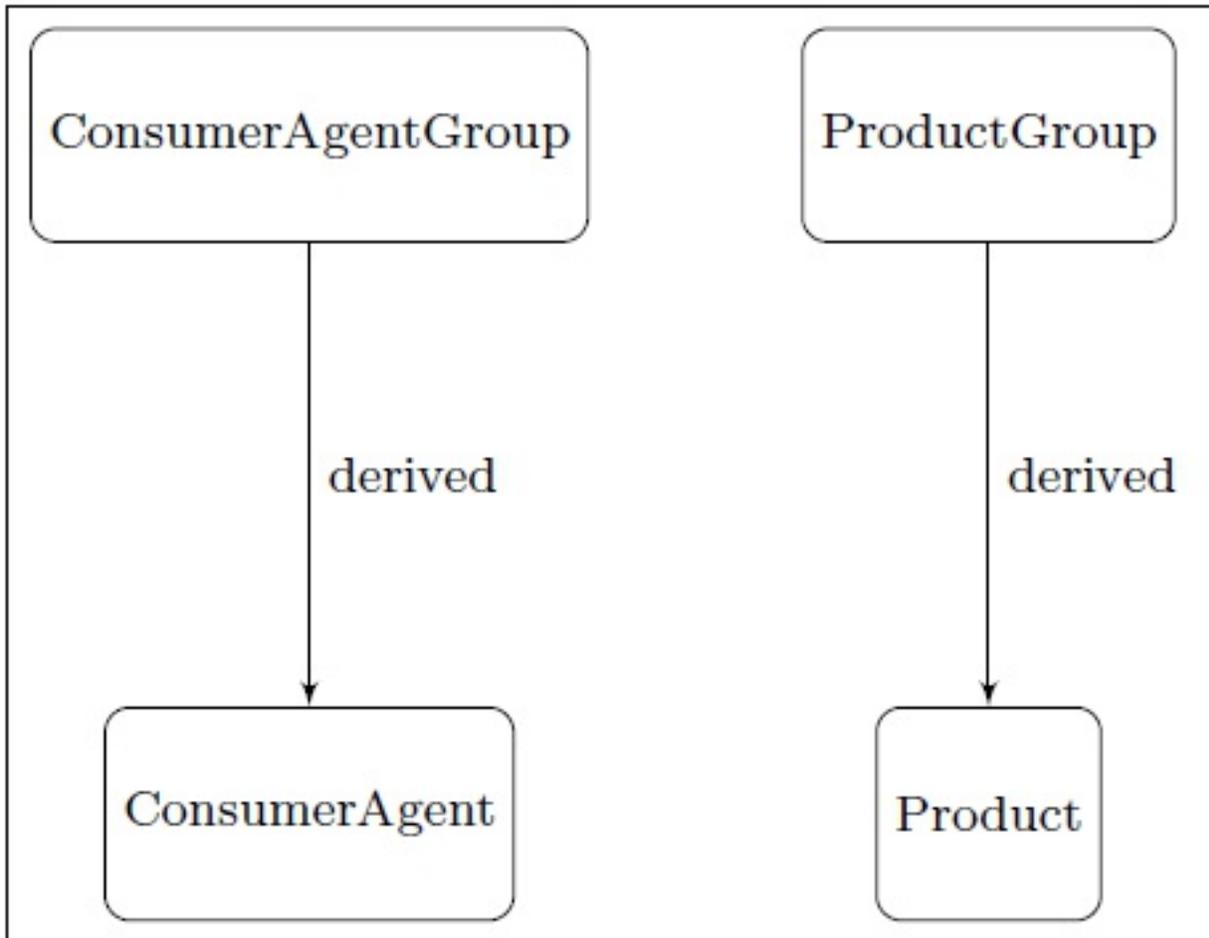


Figure 2

Two-tiered heterogeneity abstraction approach in IRPact

