

32. Staged Configuration with Key Partners and Stakeholders

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Technische Universität Dresden

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Version 20-0.6, 09.01.21

<http://st.inf.tu-dresden.de>

- 1) Staged configuration of value, feature, and component trees
- 2) The triple-layer BMC

Obligatory Literature

- ▶ [Reiser] Mark-Oliver Reiser and Matthias Weber. Multi-level feature trees. Requirements Engineering, 12(2):57--75, 2007.
 - <https://link.springer.com/article/10.1007%2Fs00766-007-0046-0>
- ▶ [Joyce] Joyce, A., Paquin, R.L., The triple layered business model canvas: A tool to design more sustainable business models, Journal of Cleaner Production (2016), <http://dx.doi.org/10.1016/j.jclepro.2016.06.067>
- ▶ [Czarnecki] Krzysztof Czarnecki, Simon Helsen, and Ulrich W. Eisenecker. Staged configuration using feature models. In Robert L. Nord, editor, Software Product Lines, Third International Conference, SPLC 2004, Boston, MA, USA, August 30-September 2, 2004, Proceedings, volume 3154 of Lecture Notes in Computer Science, pages 266--283. Springer, 2004. https://doi.org/10.1007/978-3-540-28630-1_17
 - Explains how to extend a feature model over a supply chain.

Any good business model (also an MVP)
should be improved by new variants or extensions.

Other Literature

- ▶ Kwanwoo Lee, Kyo C. Kang, and Jaejoon Lee. Concepts and guidelines of feature modeling for product line software engineering. Lecture Notes in Computer Science, 2319:62--78, 2002. Good overview on feature models, and how to develop feature groups in different concerns
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Shortcomings of Lean Startup from the Viewpoint of Software Product-Line Engineering

No support for consistent modeling of product lines
(no support for feature modeling and feature variation)

No support for canvas modeling
(composition and engineering)



No support for staged feature configuration with suppliers

No support for grading and metrics










32.1. Staged Configuration of Feature Models and Triple Bigraphs

Suppliers in a Supply Chain

The Business Model Canvas

Designed for: _____ Designed by: _____

On: Day Month Year
Iteration: No.

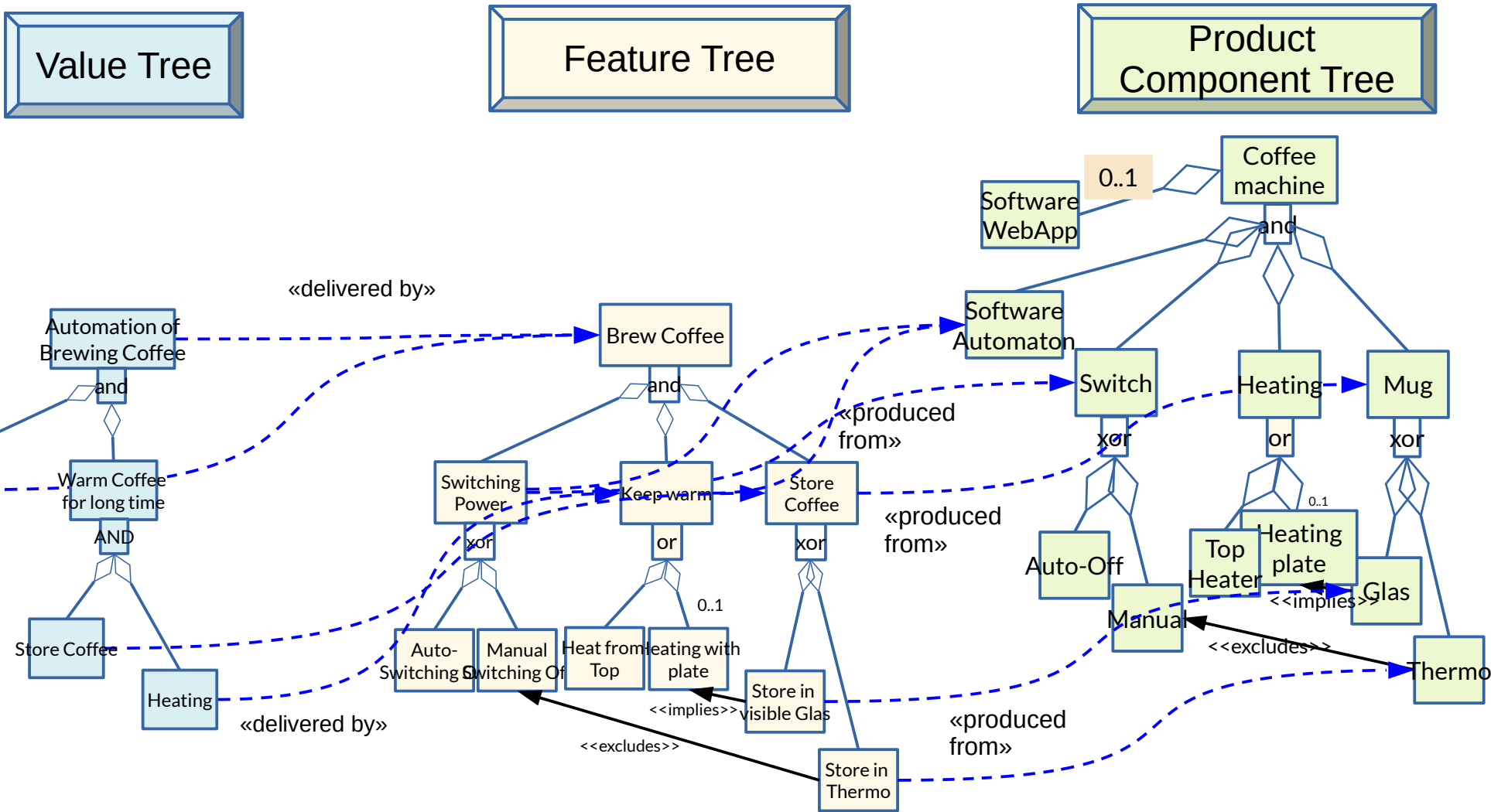
<h3>Key Partners</h3>  <p>Who are our Key Partners? Who are our key suppliers? Which Key Resources are we acquiring from partners? Which Key Activities do partners perform?</p> <p>KEY ACTIVITIES FOR PARTNERS: Logistics and assembly Production of raw material components Acquisition of particular resources and activities</p>	<h3>Key Activities</h3>  <p>Why? Key Activities do our Value Propositions require? Our Distribution Channels? Customer Relationships? Revenue Streams?</p> <p>KEY ACTIVITIES: Production Customer service "Selling the ice cream" Design Market status Sales Cost reduction Risk reduction Accessibility Customer loyalty</p>	<h3>Value Propositions</h3>  <p>What value do we deliver to the customer? Which one of our customer's problems are we helping to solve? What bundles of products and services are we offering to each Customer Segment? Which customer needs are we satisfying?</p> <p>VALUE PROPOSITIONS: Performance Customization "Selling the ice cream" Design Market status Sales Cost reduction Risk reduction Accessibility Customer loyalty</p>	<h3>Customer Relationships</h3>  <p>What type of relationship does each of our Customer Segments expect us to establish and maintain with them? Which ones have we established? How are they integrated with the rest of our business model? How costly are they?</p> <p>RELATIONSHIPS: Personal assistance Self-Service Automated Services Communities Co-creation</p>	<h3>Customer Segments</h3>  <p>For whom are we creating value? Who are our most important customers?</p> <p>SEGMENTS: Individual Segment Demographic Psychographic Multi-sided Platform</p>	
<h3>Key Resources</h3>  <p>Why? Key Resources do our Value Propositions require? Our Distribution Channels? Customer Relationships? Revenue Streams?</p> <p>KEY RESOURCES: Physical Financial Human Intellectual property, patents, copyrights, data</p>		<h3>Channels</h3>  <p>Through which Channels do our Customer Segments want to be reached? How are we reaching them now? How are our Channels integrated? Which ones work best? Which ones are most cost-efficient? How are we integrating them with customer routines?</p> <p>CHANNEL PRICES: 1. Distribution 2. Distribution 3. Distribution 4. Distribution 5. Distribution 6. Distribution 7. Distribution 8. Distribution 9. Distribution 10. Distribution</p>		<h3>Cost Structure</h3>  <p>What are the most important costs inherent in our business model? Which Key Resources are most expensive? Which Key Activities are most expensive?</p> <p>KEY COSTS: Cost of raw materials Cost of labor Cost of production Cost of distribution Cost of customer service Cost of sales Cost of marketing Cost of research and development Cost of legal and compliance Cost of infrastructure Cost of overheads</p>	<h3>Revenue Streams</h3>  <p>For what value are our customers really willing to pay? For what do they currently pay? How are they currently paying? How would they prefer to pay? How much does each Revenue Stream contribute to overall revenues?</p> <p>REVENUE STREAMS: Fixed Fee Usage Fee Subscription Fee Licensing Advertising Freemium Transaction Fee Customer segment dependent Value-based Usage-based Subscription Transaction Fee Usage Fee Licensing Advertising</p>

www.businessmodelgeneration.com



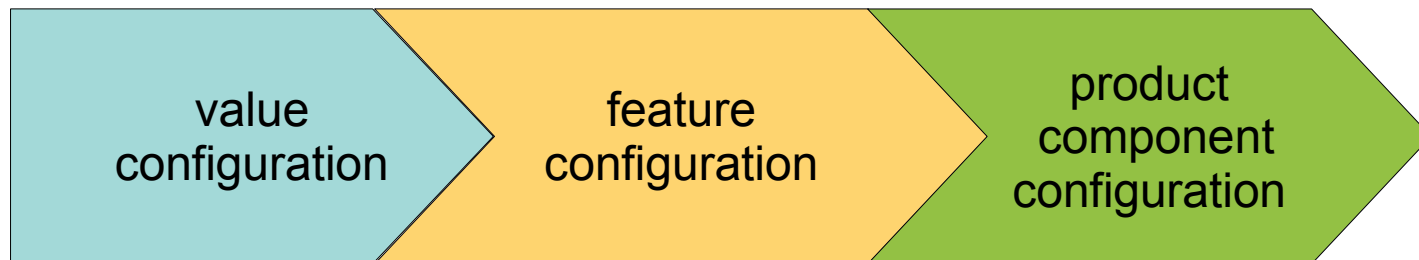
Bridging three Worlds: From Value Trees via Feature Trees to Product Component Trees

- ▶ Values can be traced via features to components of the product in the *triple bigraph* over values, features, and product components



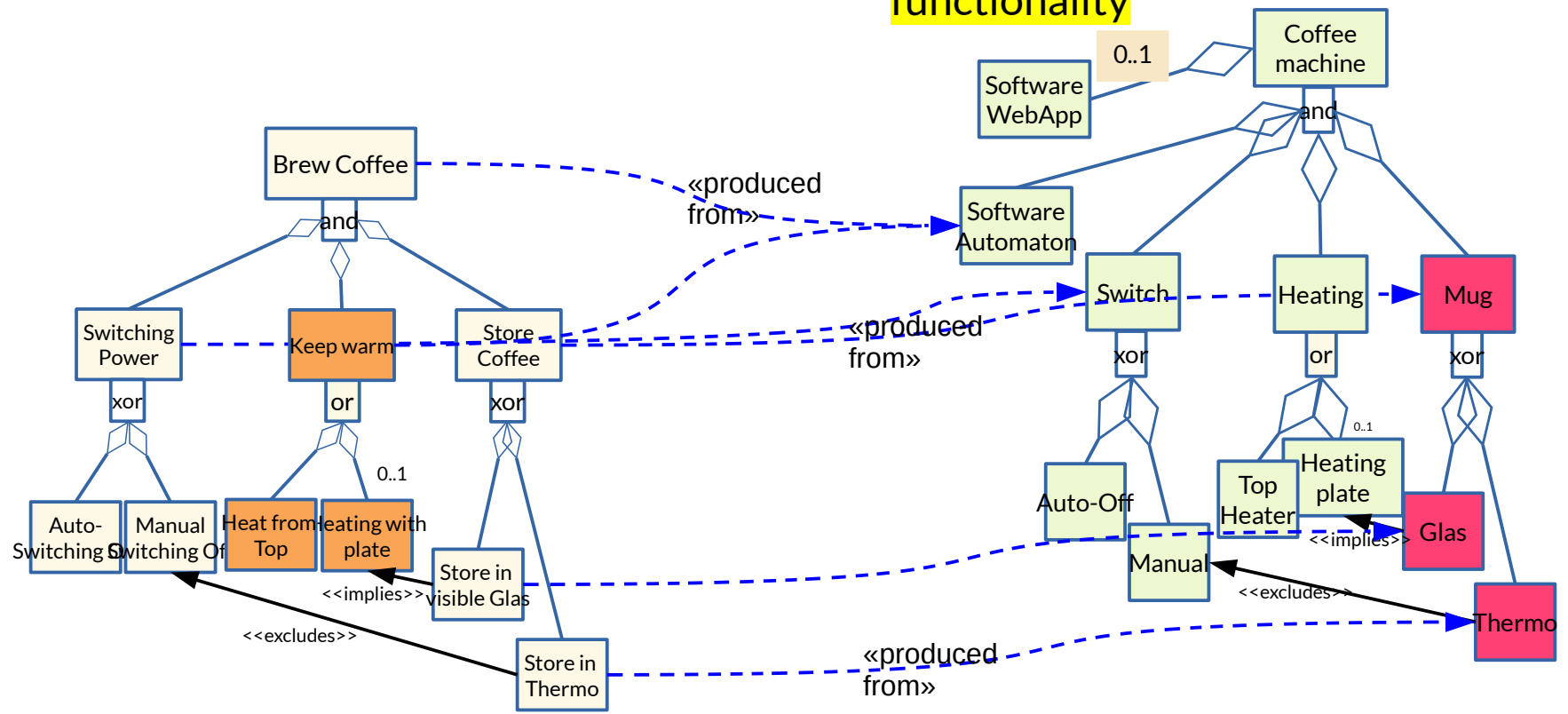
Different Classes of Configurations in the Triple Bigraph

- ▶ Value Trees, Feature Trees, Product Component Trees need to be *configured*
 - XOR configuration
 - IOR configuration
 - Optional part configuration
- ▶ **Value configuration** is the process of choosing a value
 - Features and product components are selected too (via the relations *delivered-by* and *produced-from*)
- ▶ **Feature configuration** is the process of choosing a feature
 - Product components are selected too (via the relation *produced-from*)
- ▶ **Product component configuration** is the process of choosing a product component implementation



Subtrees in Configuration can be Attributed to Key Partners (Suppliers)

- ▶ **Feature trees** can be decomposed into feature subtrees
- ▶ If subtrees are left to a supplier, a supply chain results
- ▶ **Definition of test suite proving feature**
- ▶ **Product component trees** can be decomposed into component subtrees
- ▶ These subtrees can be bought from a supplier (key partner)
- ▶ **Definition of functional interfaces**
- ▶ **Definition of tests proving subsystem functionality**



Buying Feature or Component Subtrees from a Supplier

- ▶ Requirements document for the feature or component subtree
 - Definition of functional interfaces
 - Definition of tests proving subsystem functionality
- ▶ Pricing of the subtree supply
- ▶ (Sub-)Contract about these points
- ▶ See courses
 - Softwaretechnologie
 - Softwaretechnologie II
 - Requirements Engineering und Testen
- ▶ Multi-Stage configuration is the process of confining subconfigurations to all supplier-based subtrees of the triple bigraph (values, features, components) [Reiser] [Czarnecki]

32.2 Triple Layer BMC (TLBMC) for Sustainability of Key Partners and Key Resources

Shortcomings of Lean Startup from the Viewpoint of Software Product-Line Engineering

No support for consistent modeling of product lines
(no support for feature modeling and feature variation)

No support for green
and social aspects

No support for canvas
modeling
(composition and
engineering)

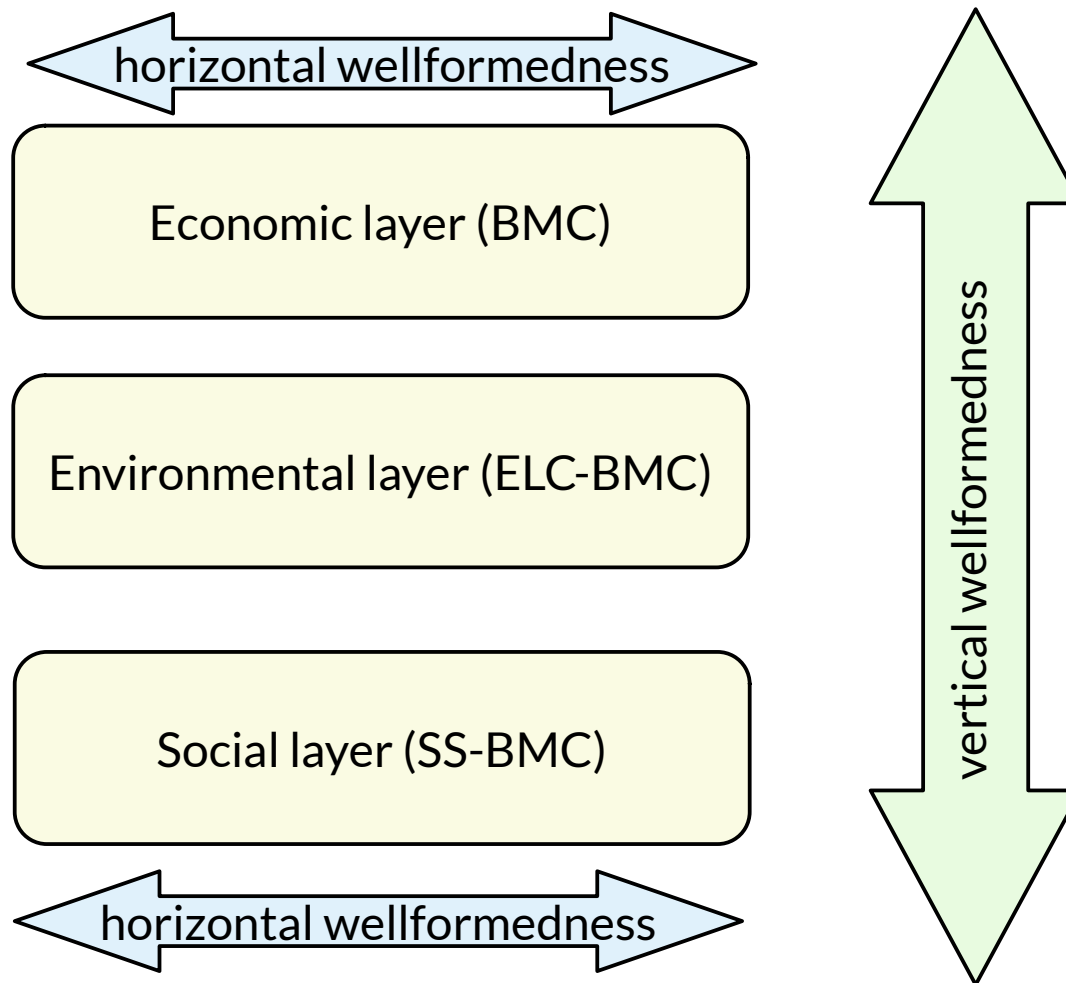


No support for staged
feature configuration
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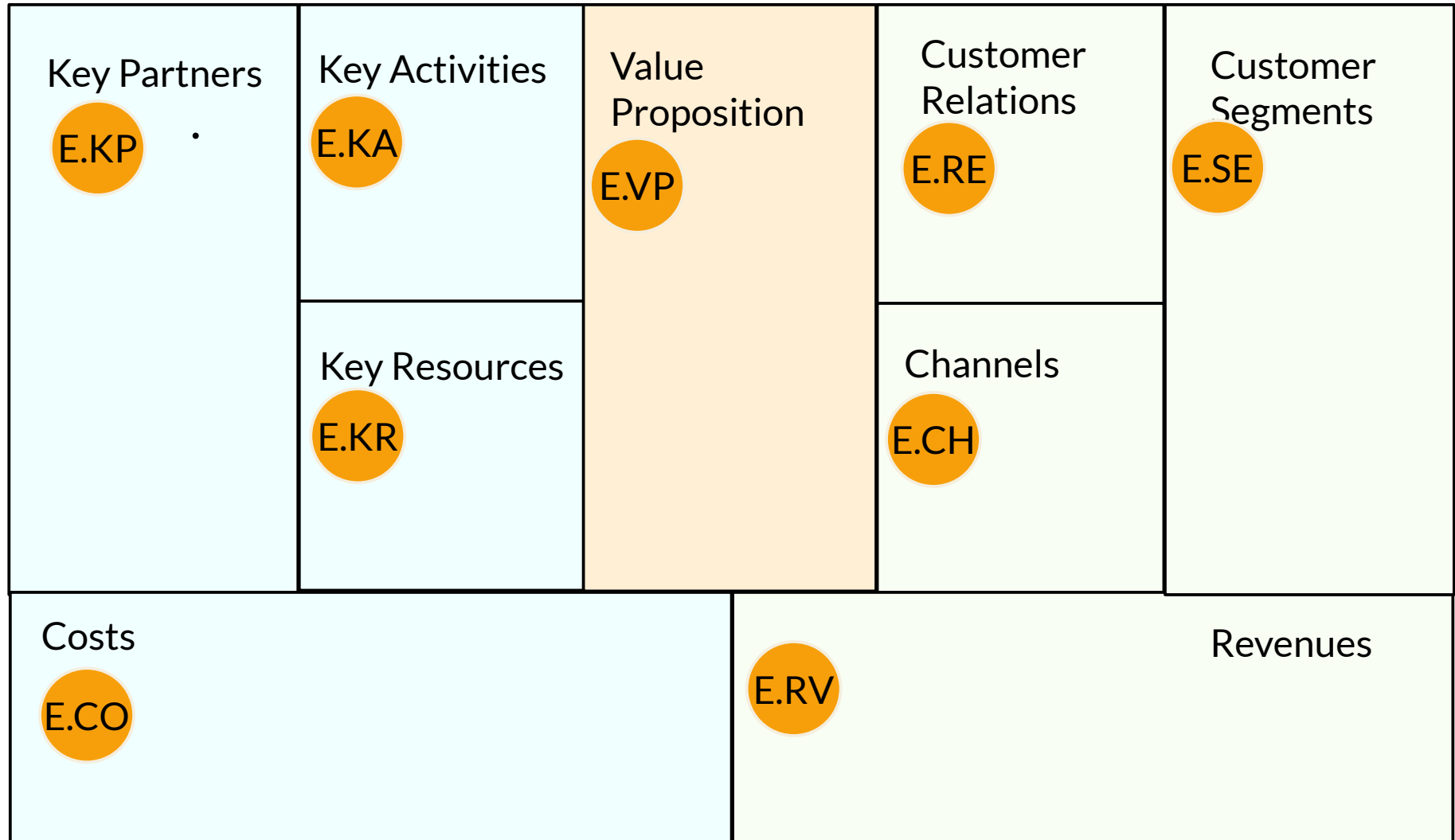
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The Triple Layer BMC [Joyce]

- ▶ Designing economic, sustainable and social products

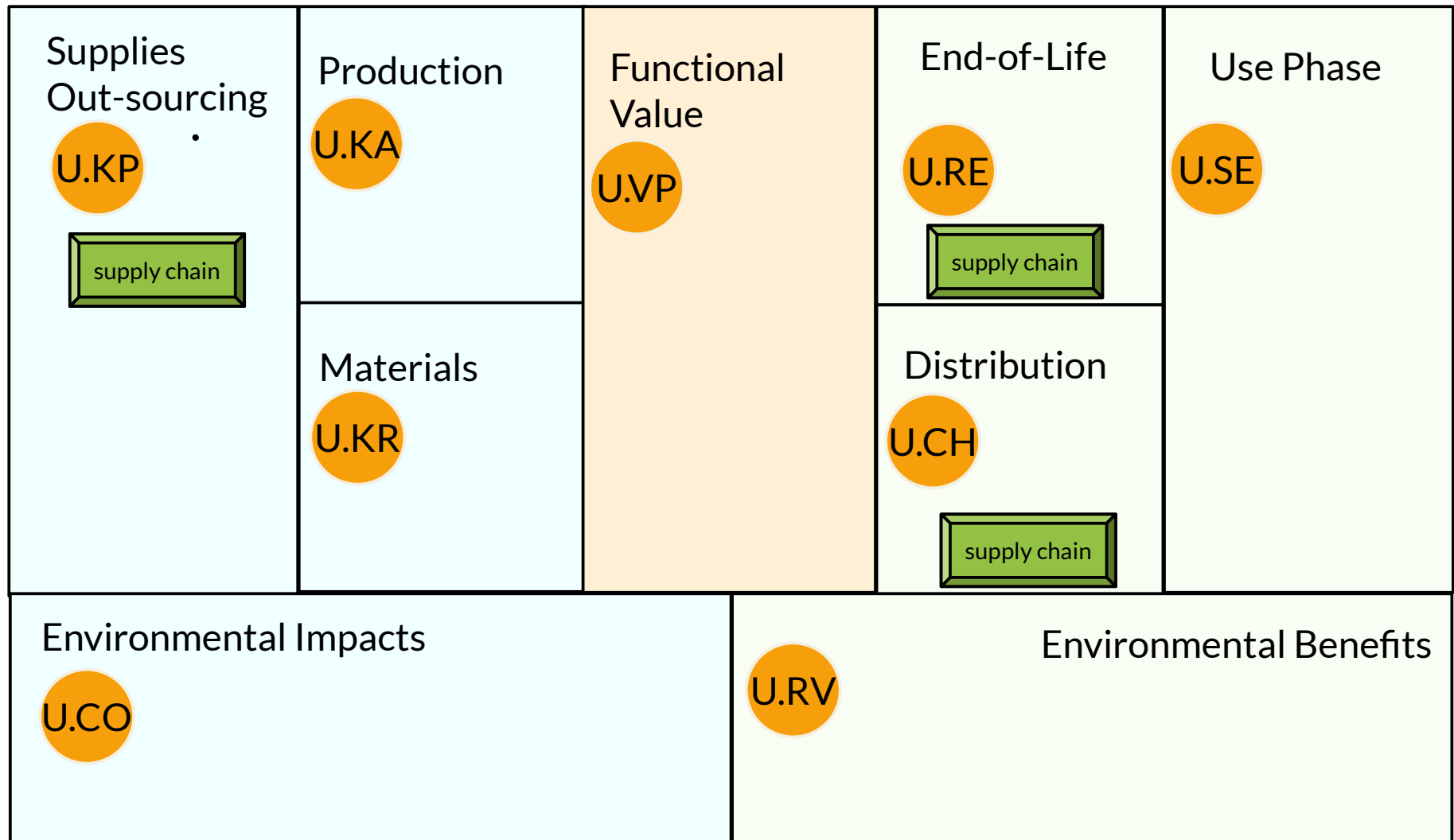


BMC (economic layer)



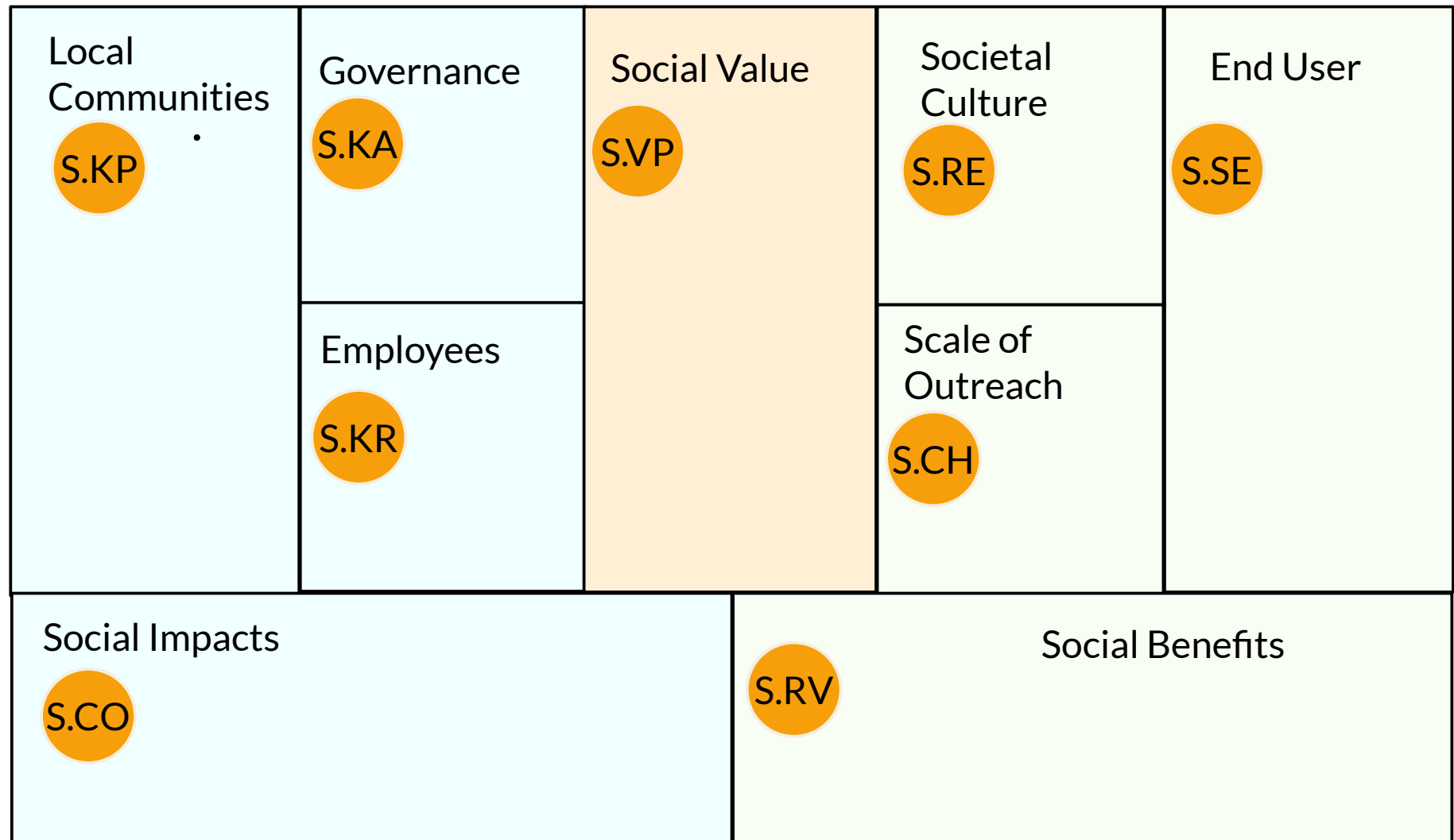
Environmental Life Cycle BMCanvas (environmental, Umwelt layer)

- ▶ What is the environmental value of the product (U.VP)?



Social Stakeholders BMCanvas (social layer)

- ▶ What is the social value of a social business company?



Horizontal Wellformedness (Consistency)

- ▶ There is a simple consistency algorithm:
- ▶ forall field in Fields: compare E.field to U.field to S.field
- ▶ The TMBMC generates much larger value trees than the BMC.
 - How are feature trees influenced from these larger value trees?
 - Some economic values become red due to the social and environmental values.
What does this mean?
- ▶ Exercise: in the paper [Joyce], Nespresso TLBMC is discussed with aluminium capsules. Put up a new TLBC for coffee pads in filter bags (compostable), and compare the TLBMC, in particular the environmental layer.

The End

- ▶ Explain the difference of a BMC and a TLBMC. What is vertical consistency?
- ▶ How do you distribute features to your supply chain?
- ▶ Which tests do you need if you delegate a subtree of the feature model to a supplier?



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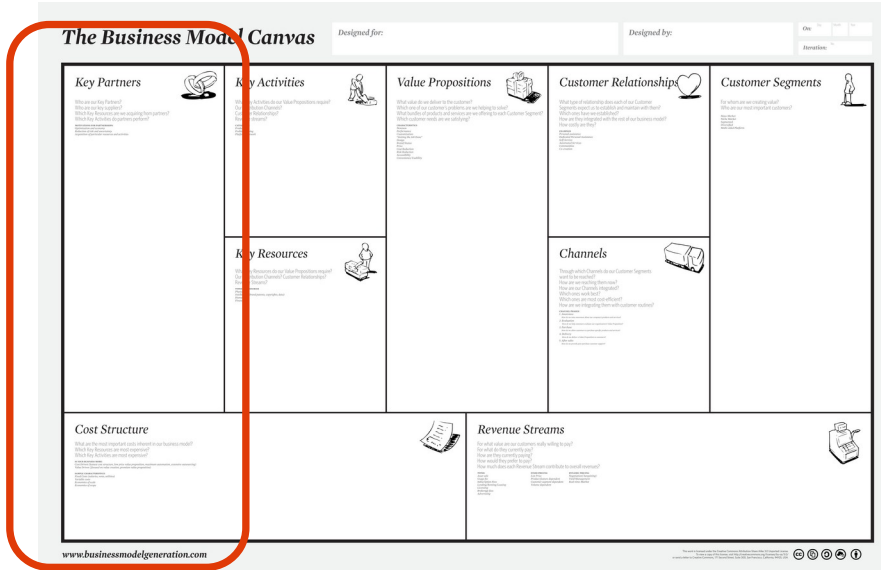
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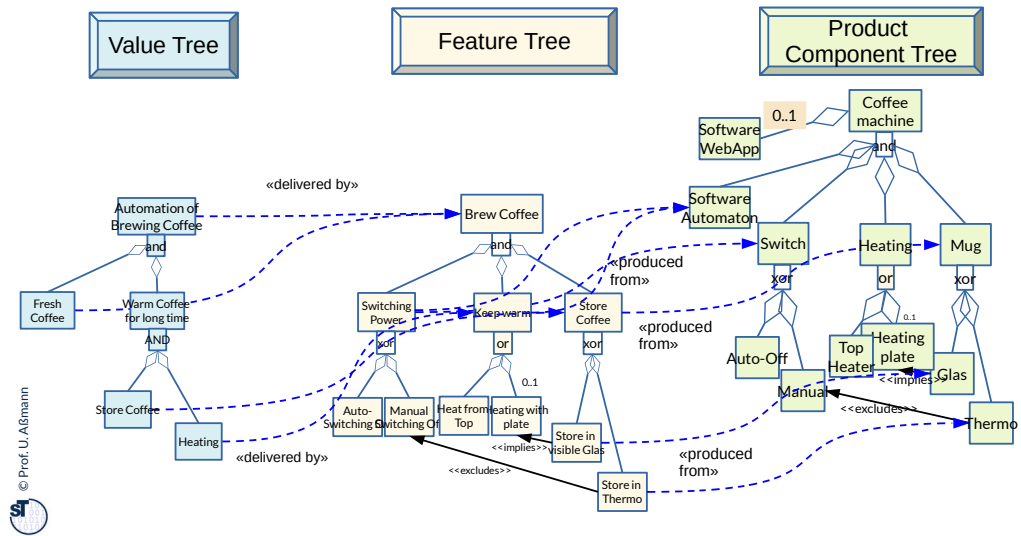
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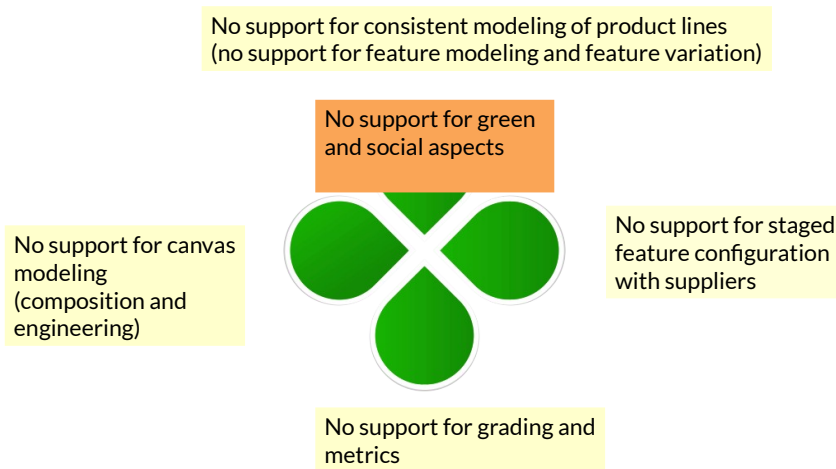
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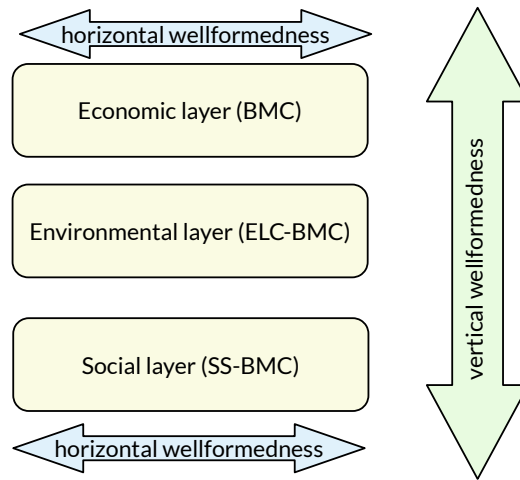
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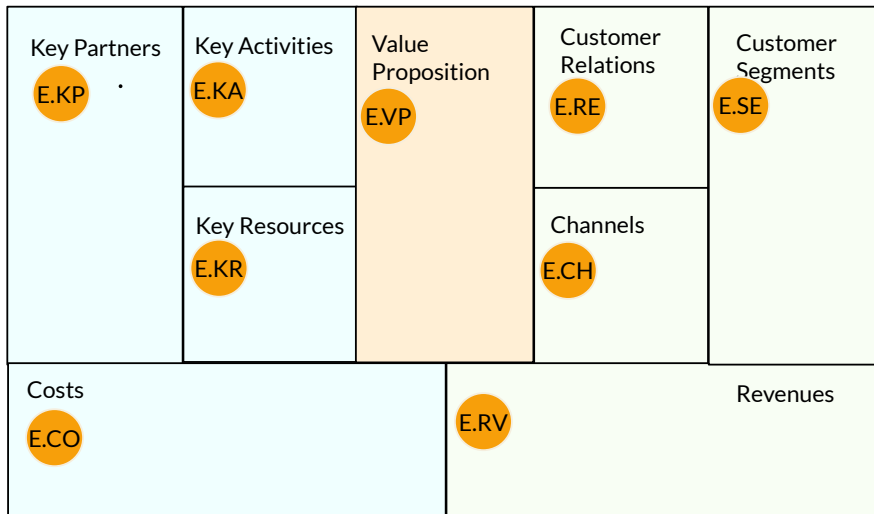


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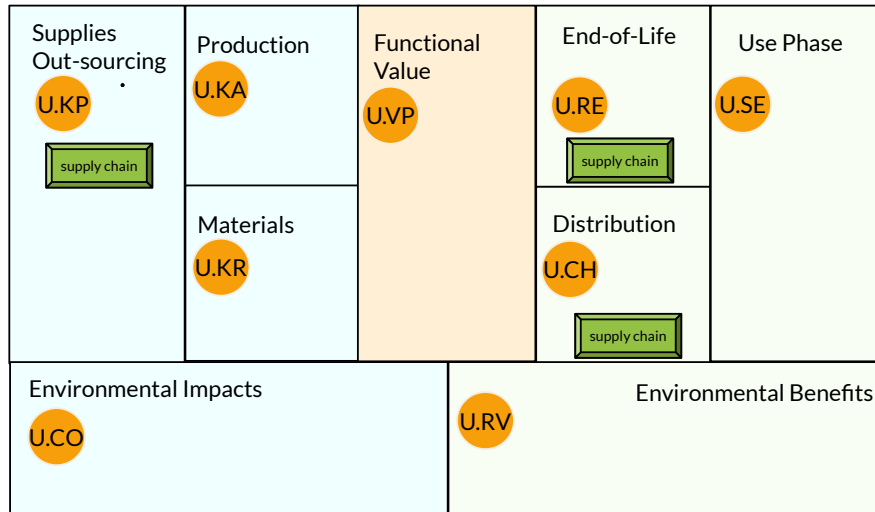


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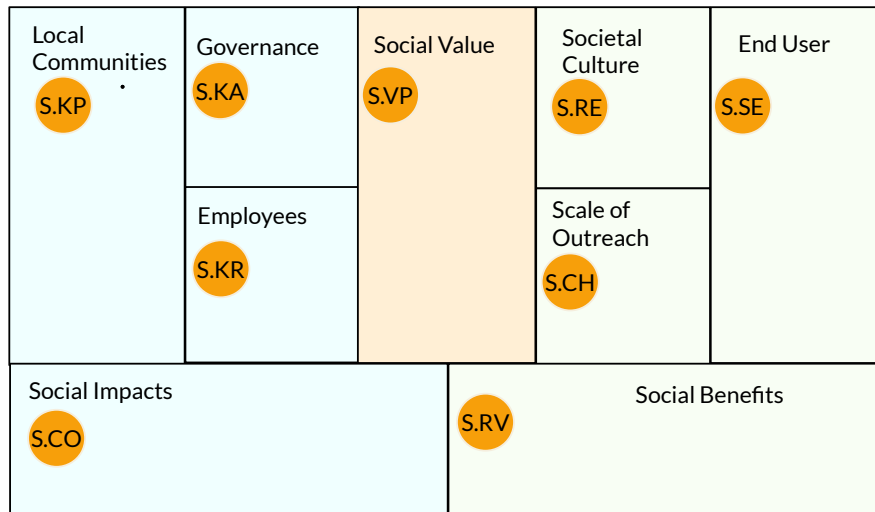
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