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Linking Strategy and Operations using a Service Business Model – a hypergraph theory-based approach

Business models (BM) have become increasingly important and versatile abstract tools to describe businesses on both, a strategic, as well as operational level (Wirtz et al. 2015). These BMs are used to understand what a business does to remain competitive, strategically (Johnson et al. 2008). Existing research (Johnson et al. 2008; Wirtz et al. 2015) identified the importance of BMs for the success of businesses. Also, practice revealed that financially successful companies ascertain twice the level of importance than less successful companies (IBM, 2007). A BM is a conceptual and structural implementation of a business strategy and the foundation of business processes (Osterwalder and Pigneur, 2002).

BMs include a strategy, input factors, processes, with an underlying financial model to ensure the profitability. In recent years BMs have become synonymous with entire companies. Literature shows a heterogeneous abstraction of BMs, sometimes referring to BMs as business unit or products (Wirtz et al. 2015). Service systems literature shows similar structures, with service systems referring to exchanges on an individual level, among business units or entire ecosystems (Chandler and Lusch 2015). We propose that a service systems perspective can systematically model businesses and capture its inherent complexities (Peters et al. 2015). The service business model (SBM) includes (1) the value proposition, which is the firm's offering to the customer; (2) the value creation and delivery mechanisms, reflecting the value chain; (3) value capture and analysis of the BM and its constituent elements to understand how the firm generates profit. Our model, thus, captures the holistic characteristic of BM, while retaining the detailed information on how the business is constructed.

Businesses are confronted with a complex, digitalized world, in which important service innovations are continuously emerging, which need to be designed and linked to the BM of a company, thus addressing the strategy to execution gap (Kaplan and Norton 2009). Typical BM tools, such as the business model canvas (Osterwalder et al. 2005), only provide a descriptive framework for structuring businesses, missing the interrelations of its BM elements. This is important for operational decision makers, who implement new service innovations. In sum, without a SBM that relates the high level strategic information to the detailed operations perspective, BMs only reflect half the picture.

Hence, we develop a hypergraph theory-based underlying model for businesses to understand how the business works both from a strategic perspective, as well as from a detailed operational perspective. Our SBM makes value creation visible, relying on a systems perspective linking multi-dimensional input factors with set of activities and actors and thus capturing value proposition, value creation and delivery and value capture mechanisms (Li & Peters 2018). Attached table shows an overview of our SBM, which relies on a formally model (Li et al. 2018). It represents a base structure of businesses and can be used for operational purposes too (e.g.: scheduling, planning and cost analyses) and thus enables a high level strategic perspective to be integrated into the operational perspective, bridging the gap between strategy and execution for successful businesses.

System Appendix

Service System Concepts	**Visualization**		**Mathematical Notation**
Resource	nodes/vertices		r∈R
Actor	hyperedge		a ∈A and $a_i \subset$R and R=$\bigcup_{i=1}^{n} a_i$
Service Object	hypergraphs		o∈O ⟨R, A⟩,
Service Activity	mapping ψ		ψ: O → O
Value Creation	Set of activities Ψ		$\bigcup_{\forall 0} \psi(o)$
Value Proposition	ψ and hypergraph		ψ(o)
Service System	service system graph		S⟨ R, A, ψ⟩