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Business Model Topology in Emerging Business Ecosystem

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***Abstract*—**This paper describes topology of business models in market ecosystem of the emerging electric mobility industry. The business model topology shows that firm's participation in the ecosystem is associated with different requirements on resources and capabilities, and different levels of risk. Business model concept is used together with concepts of networked value creation and shows that firms can achieve higher levels of sustainable advantage by cooperation, not competition. Hybrid business models provide companies a viable alternative possibility for participation in the market ecosystem.

***Keywords*—**Business model, ecosystem, topology.

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I. Introduction

BUSINESS ecosystems can provide substantial opportunities for participating companies. However, these opportunities come with a catch – the business model of the company must fit together with the business models of the other companies in the ecosystem, so that the business model provides value for both the company and the market ecosystem.

The existing research on business models has mainly focused on independent firms, overlooking the need for a fit with other market participants, while the existing research on business ecosystems and networks has mainly focused on the whole network and paid less attention to the profitability of individual firms within a network [1], [2]. More research is therefore needed for understanding what kinds of business models can be successful in emerging ecosystems and how such business models come about.

We have developed a typology of business models in an emerging business ecosystem. The typology specifies business models and their central characteristics. The specification also includes the capabilities and resources required for each business model and typical risks associated with each. The typology is based on extensive empirical research in the Finnish electric vehicle ecosystem and the findings have been validated in the international context.

II. Previous Research

Previous research has shown that business models matter in the context of individual firm. For example, Chesbrough [3] specified the concept and functions of business model. At its core, a business model performs two important functions: value creation and value capture. First, it defines a series of activities, from procurement of resource inputs to client relationships, which will yield a new product or service in a way that net value will be created throughout the various activities. This is a crucial point, because without the net creation of value, the other companies involved in the set of activities are unlikely to participate. Second, a business model captures value from a part of these activities for the firm developing and operating it. This is also crucial, since a company that cannot earn a profit from some portion of its activities cannot sustain those activities and competitive advantage over time.

Chesbrough [3] also depicts the functions of business model. Firstly, business model articulates the value proposition: the value created for users by the offering. Secondly, it identifies a market segment: the users to whom the offering is useful and for what purpose. Thirdly, business model defines the structure of the value chain required by the firm to create and distribute the offering, and determines the complementary assets needed to support the firm's position in this chain, including company's suppliers and customers. Fourthly, business model specifies the revenue generation mechanisms for the firm, and estimate the cost structure and profit potential of producing the offering, given the value proposition and value chain structure chosen. Then, business model describes the position of the firm within the value network, or ecosystem, linking suppliers and customers, including identification of potential complementors and competitors. Finally, business model is used to formulate the competitive strategy by which the innovating firm will gain and hold advantage over rivals.

Thus, business model is a unique concept, useful both for managers, company owners, strategists and researchers. However, the definition by [3] is not exhaustive. Other authors [4] identified six major themes with corresponding representative definitions present in business model discussion (Table I).

The concept of business model can be useful in a variety of empirical settings. The emerging electric vehicles ecosystem in Finland constitutes an empirical setting of this article. Previously, researchers who studied similar empirical context, have focused on value chain of electric mobility (Fig. 1).

However, this description of the network and business models remained incomplete, as it misses on several operators that are active part of electric mobility ecosystem. First, government agency provides financial incentives for market participants, as it does in virtually all countries where similar ecosystems for electric vehicles exist. Government agency can also serve as a market system integrator, as it is in case of

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Singapore electric vehicles ecosystem [17]. Also, the market ecosystem provides opportunities for third companies, not directly involved in value creating activities, such as consulting companies, to serve as system integrators and capture their share of value created by other ecosystem participants. The next part of this article tries to bridge the gap and identify business logics of participation in the ecosystem.

TABLE I
THEMATIC SUMMARY OF BUSINESS MODEL LITERATURE (ADOPTED FROM [4])

Theme	Sample Publications	Summary
Design	[5], [6]	Agent-driven or emergent configuration of firm characteristics.
RBV (resource-based view)	[7], [8]	Organizational structure codeterminant and coevolving with firm's asset stock or core activity set.
Narrative	[9]	Subjective, descriptive, emergent story or logic of key drivers of organizational outcomes.
Innovation	[10]	Processual configuration linked to evolution or application of firm technology.
Transactive	[11], [12], [1]	Configuration of boundary-spanning transactions.
Opportunity	[13], [14], [15]	Enactment and implementation tied to an opportunity landscape.

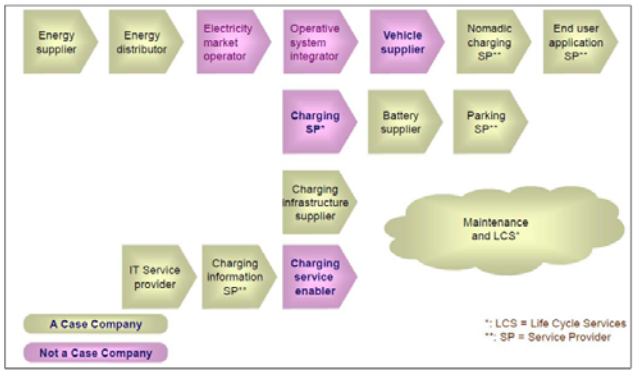


Fig. 1 Generic industrial e-mobility value chain (adapted from [16])

III. TYPOLOGY OF BUSINESS MODELS

The topology of business models is derived from ongoing study of emerging electric vehicle ecosystem in Finland. So far we have conducted 68 interviews in the ecosystem (31 in 2010 and 37 in 2012), carried out approximately 60 hours of observation, and collected significant amount of documents.

Until now we have identified the following business models in emerging market ecosystems:

A. Cost saving model
B. Ideology increasing perceived value of product
C. Integrator / intermediary
D. Technology supplier
E. Service provider
F. Infrastructure provider
G. Hybrid models

A. Cost Saving Model

Logic of business model. The basic premise in the cost saving model is that a firm joins an ecosystem because the ecosystem allows the firm to save some costs. In the Finnish electric vehicle ecosystem, we saw some companies adopting electric vehicles because they reduced the operating costs. In this way, the firm benefitted directly. At the same time, the ecosystem grew larger, as the number of electric cars in Finland increased. This provided legitimacy for other actors in the ecosystem and also provided some collaboration opportunities. The cost saving model is typically a sub-element of a broader business model in a company. They typically have a model that provides income for them, and this income need not be part of the emerging ecosystem – rather, only the cost saving aspect is related to the emerging ecosystem.

Required capabilities and resources. The use of the cost saving model requires predictable operations such that the financial consequences of investments in a technology or service can be reliably calculated. This typically means bulk operations.

Risks. Typical risks in the cost saving model relate to technological and legal uncertainty. Costs savings typically occur over several years and require large initial investments. Assumptions relating to the durability of the technology and legal factors, for example, taxation have significant influence on the results of initial financial calculations. As these calculations are used as a basis for the decisions, any mistaken assumptions can lead to costly mistakes.

Developmental pattern. So far we have seen that cost saving models can appear in new ecosystems at early stages. It seems that the ability to so tangible financial benefits reduces the uncertainty associated with emerging ecosystems and new technologies. These companies are, in many ways, the first actors who can see concrete benefits from joining an ecosystem.

The developmental scenario of these companies can take three paths, each of which is related to the actual costs savings realized. In the positive scenario, participation in the ecosystem unambiguously decreases costs over time and the company continues to participate in the ecosystem with increasing investments. Not only does this require the ability to measure the costs accurately, but also the technology, services, etc. must work in a reliable way. For example, the batteries of electric cars should continue functioning sufficiently well to ensure that no unexpected additional costs appear.

In the ambiguous scenario, the actors think that the participation may have reduces their costs. However, in the absence of strong evidence, they keep speculating about this and consider alternative options. Increasing investments in the ecosystem remain unlikely. In the negative scenario, the anticipated costs savings fail to realize and there is strong evidence of that. The firm consequently tries to reduce its involvement in the ecosystem.

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B. Ideology Increasing Perceived Value of Product

Logic of business model. Association with the central positive elements of the ecosystem can increase the perceived value of the company's product in customers' and other stakeholders' and general public view. For example, association with electric cars makes a delivery company look more positive in the eyes of the customers, and membership in a newly created alliance for low carbon cities can give participants a green image.

Required capabilities and resources. The actor attempting utilize this business logic needs an ability to manage images and perceptions and provide congruence between actions and communications. Intentions, actions and outcomes need to be coherent, and core-operations need to be decoupled from surface image. Further, actor needs a certain degree of "self-control" to not destroy the image with actions that are incongruent with ideology and ability to gain supporters and facilitate identification among them.

Risks. Risks associated with this business logic include the vulnerability of reputation to incidental mistakes or systematic decoupling and its dependence on public discourse and its change.

Developmental pattern. Two potential origins of this business logic include the concrete experience that triggers passion (case of a green delivery company), and use of ideology to gain momentum and legitimacy for existing operations. Consequences of this business logic develop either according to the positive scenario, whereas ideology sells and business grows, or to the negative scenario, whereby image can collapse of the image leads to cynical reactions and rejection, or change of public discourse leads to disappearance of the hype around the ecosystem, reducing the perceived value generated by the ideology.

C. Integrator and/or Intermediary

Logic of business model. In this business model the actor brings together other network participants, whose activities are complementary. When they start collaborating, the value generated is larger than the sum of their independent parts. The integrator/intermediary takes some of the profits through various contractual arrangements (consulting fees, membership fees, ownership, licensing, etc.). In some cases, the integrator may be serving public goals and does not directly take a share of the profits, while the additional value produced for customers and other stakeholders can be perceived as value appropriated by the integrator/intermediary.

Required capabilities and resources. This business model requires an ability to see big picture and connections, and ability to influence actors through e.g. taxes or other means of control. It also requires a high level of legitimacy in the network, and pertains the advantage of structural holes, whereby actors see the integrators network as a resource, and the purpose is to bridge structural holes to generate value.

Risks. Risks are associated with the loss of central position or the development of a network faster than what the aspiring integrator can handle.

Developmental pattern. Firstly, entrepreneurial pattern comes about through continuous network building and value creation, accumulation of capabilities and reputation. Then, a governmental mode implies an appointed role where legitimacy comes partly from the role and helps in starting. Further development depends on the ownership mode: shareholder can enjoy growing ecosystem and gain dividends. In case of no ownership, an actor must generate knew networks and/or services because value generated by integrator decreases as the network stabilizes and becomes more structured and institutionalized. Further, there is always a latent possibility of failure if no one joins the network.

D. Technology Supplier

Logic of business model. Technology suppliers develop, manufacture, and provide technological solutions for other actors in the ecosystem. Examples range from battery and component manufacturers to the providers of integrated products like electric cars and charging stations.

This business model allows the greatest extent of innovation in the business. There is considerable variety in their revenue streams, including, for example, direct sales, leasing, etc. This is made possible because they have something tangible, around which they can build attractive solutions. These things that are around the core technology can have significant impacts. Technology providers are in a good position to complement their core business logic to other models (see hybrid models below) because the core technology enables expansion.

Required capabilities and resources. Technological competence and sufficient financial resources for R&D.

Risks. Technological uncertainty and challenges, competition, compatibility and standards, demand uncertainty.

Developmental pattern. Origin of this business logic is in technology driven projects; start-ups and corporate ventures: emerging ecosystems provide better opportunities for newcomers than established industries due to low barriers to entry. Also established technology companies can benefit through asset stock accumulation and strategic choice of this business model.

E. Service Provider

Logic of business model. Provide services specifically targeted for the idiosyncratic requirements of the members of the emerging ecosystem. For example, charging station for electric cars and software developers for electric vehicle system (payment, roaming, applications, etc).

Required capabilities and resources. Ability to understand changing customer needs, ability to proactively shape customer needs.

Risks. Competitors can copy services, implementation challenges, demand uncertainty

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Developmental pattern. In this business logic, developmental pattern can range from entrepreneurial ventures to governmental agencies.

F. Infrastructure Provider

Logic of business model. Public infrastructure providers typically serve the generic public and their purpose is to facilitate wellbeing and/or economic development in their region. The value generated through their actions is thus appropriated to generic public rather than any single actor. Private infrastructure providers differ from public in that they also have stronger pressures to ensure financial feasibility of their operations.

Required capabilities and resources. Necessary technical skills, dialogue skills to understand/influence the needs of the people/entities served

Risks. Technological and legal uncertainty (e.g., standards), will anyone use the infrastructure provided (e.g., the charging stations)

Developmental pattern. Incremental development of existing infrastructure towards new vision and/or based on current immediate needs**,** planning driven radical changes/projects. Scenarios range from infrastructure used until it outdates; infrastructure never used. Developmental pattern of this business logic implies engagement in broader collaborations.

G.Hybrid Models

Hybrid models combine elements of the models outlined above. The characteristics of the hybrids depend on the models combined, some of them having complementary elements. Emerging ecosystems seems to enable various hybrid models.

IV. Implications and Conclusion

Emerging ecosystem is a highly uncertain environment. Our topology has outlines capabilities needed for each business model and what risks are associated with each. We have also outlines the typical development patterns associated with each business model. Our model thus reduces the uncertainty and allows companies make more informed choices.

Companies interested in joining an emerging ecosystem can use our topology for selecting the optimal approach for them. The typology also outlines the key requirements, risks, and processes associated with each. For companies already doing some activities, the typology can help to better understand the requirements, opportunities, and risks associated with their actions. Thus, by conceptualizing what they are already doing, they manage their activities better and make more strategic choices.

These business models already exist, and more will evolve in the emerging ecosystem. How each actors' business model evolves over time through participation in an emerging ecosystem is an important aspect that we will also study in the future.

Established players can change their business model in emerging ecosystem. It allows them to expand their scope. The typology can help in seeing various alternatives for such an expansion and choosing the best courses of action.

One of the interesting finding of our study are the hybrid models. The unique combinations of various business logics in complementary ways can differentiate companies, facilitating sustainable growth. The deployment of existing capabilities in previously unexplored ways can unexpected synergies and complementary value creation.

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