



The role of incumbent car manufacturers in the interacting TISs of low and zero emission vehicles



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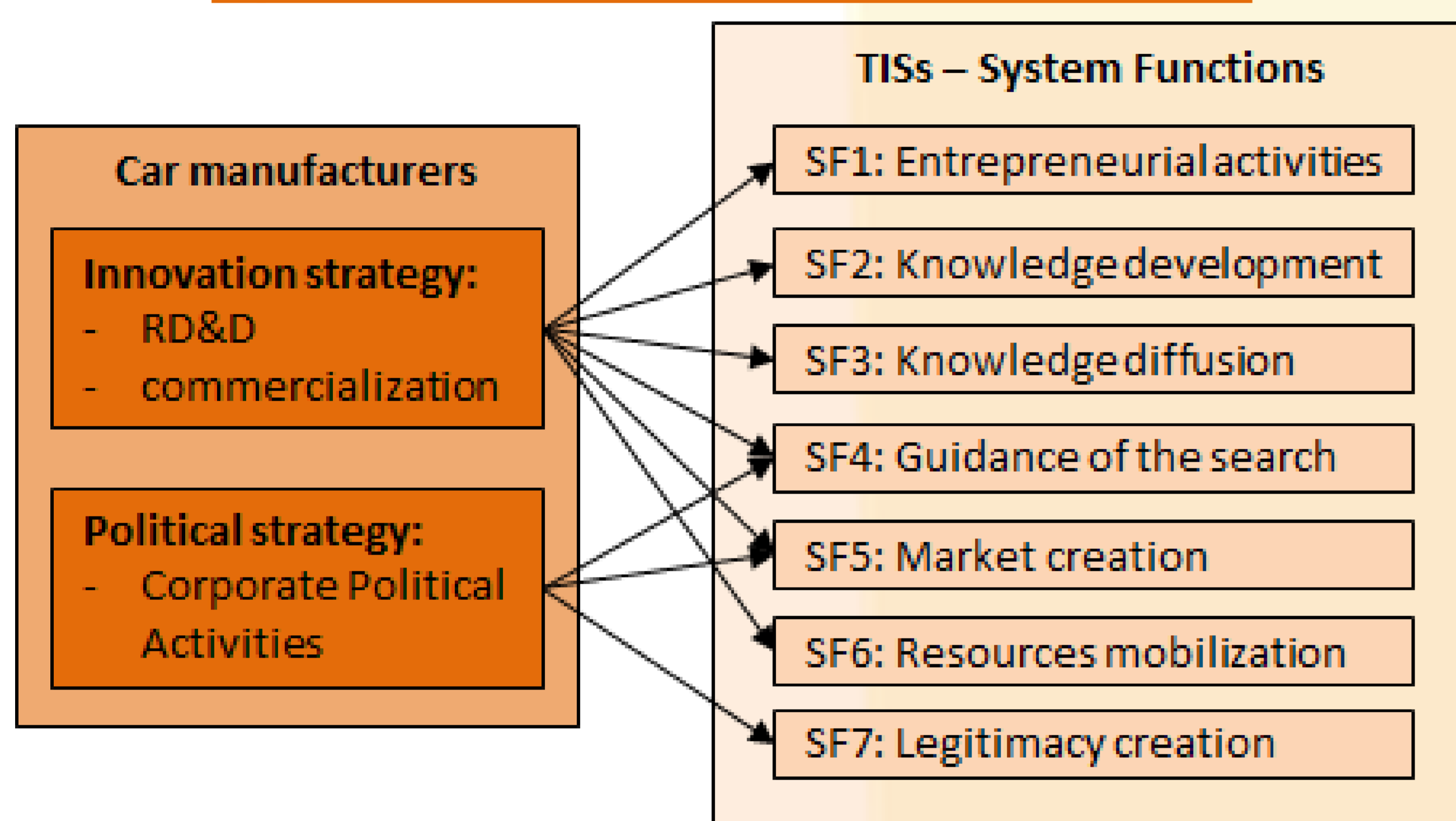
Issue

Under regulatory and competitive pressures, large incumbent car manufacturers are becoming increasingly innovative in a wide portfolio of low and zero emission vehicle technologies (Wesseling et al., TFSC; BSE; forthcoming). Each of these technologies are supported by their own Technological Innovation Systems (TISs). Car manufacturers thus influence multiple TISs that compete for the attention and resources of these actors. In other words car manufacturers constitute an important part of the interaction between the TISs of low and zero emission vehicles. We study how these TISs interact by focusing on the role of powerful incumbent car manufacturers.

Research question

How do incumbent car manufacturers influence the interacting TISs of low and zero emission vehicles?

Figure 1, Influence of car manufactures on TISs



Theory

Firms influence TIS development through the strategies that guide their actions. We distinguish between **innovation** and **political strategies**.

The **innovation strategy** of a firm dictates how the firm intends to exploit an innovation; a firm may employ different innovation strategies for different innovations.

Innovation strategies entail **RD&D activities** that support the TIS of a given innovation through different system functions (Hekkert et al., 2007) – see Figure 1. Innovation strategies also entail **commercialization activities**, like competitively producing and advertising innovations. Commercialization activities may drive other system functions – see Figure 1.

The **political strategy** of a firm determines if and how the firm intends to influence the regulatory environment to maintain or create value for its assets.

Political strategies are supported by **corporate political activities** that aim to influence policy making through different tactics. These tactics include information, financial, litigation, constituency building and political connectedness tactics (Wesseling et al., forthcoming). Through corporate political activities, car manufacturers are able to influence TIS development through various system functions, see Figure 1.

Approach

Political strategies:

- **Content analysis** of database: **corporate political activities** were obtained from 5 public hearing transcripts, 83 letters to policy makers, 263 documents from the CARB and environmental protection agency website, and 16 interviews.

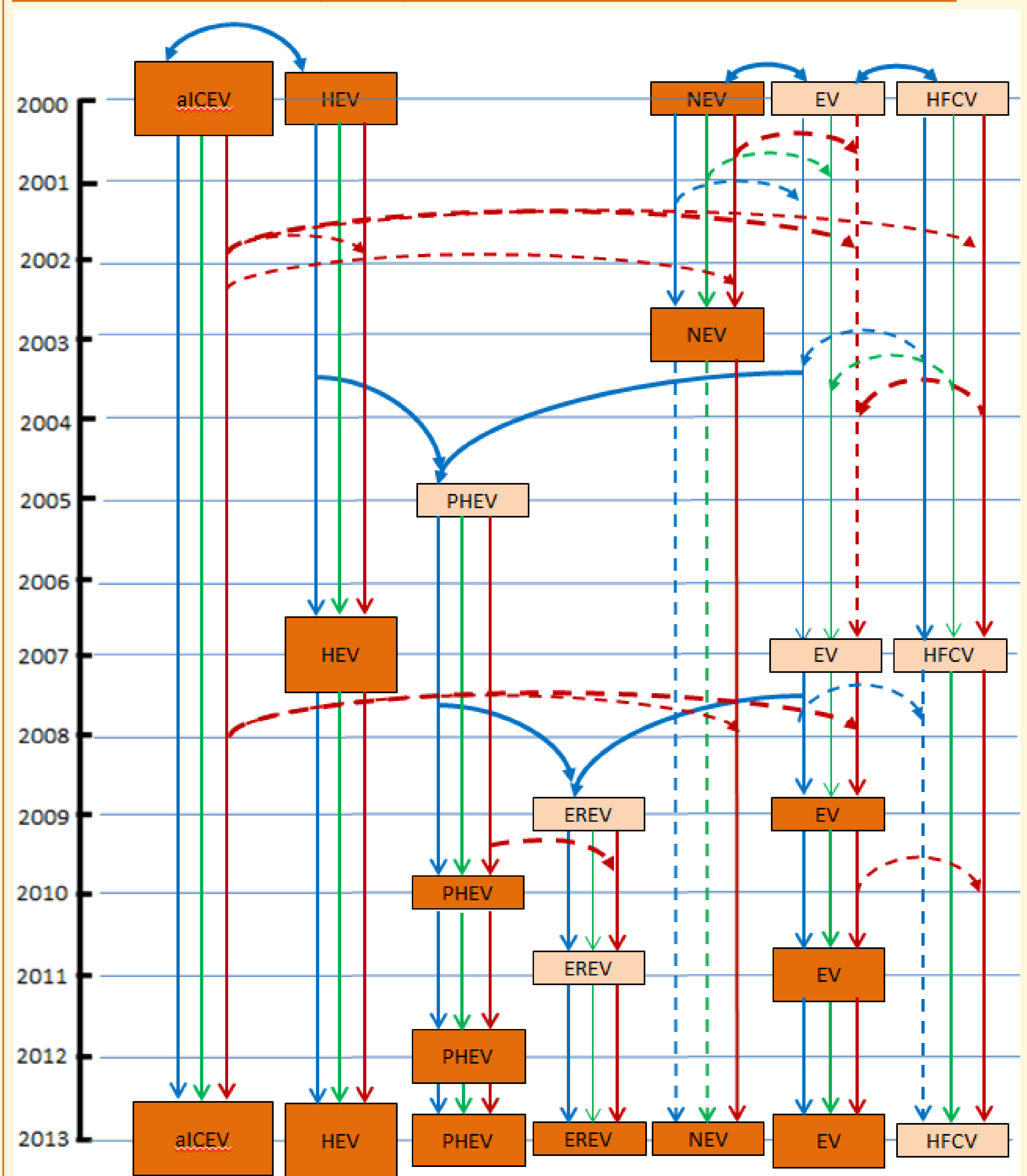
Innovation strategies:

- 1) **Quantitative analysis** of database: **RD&D activities** are indicated by patents on the technological development of L/ZEV technologies, obtained from the International Patent Office database;
- 2) **Quantitative analysis** of database: **commercialization activities** are indicated by L/ZEV sales figures in the US (since worldwide sales data are not available), obtained from DoE website.

Preliminary findings

1. Car manufacturers have very broad **RD&D portfolios**; a little bit more focused **political strategies**; even more focused **commercialization activities**.
 To illustrate: GM's **RD&D** portfolio comprises aICEVs, HEVs, PHEVs, NEVs, EVs, and HFCVs; their **corporate political actions** support aICEVs, HEVs, PHEVs, NEVs and HFCVs; they **commercialize** aICEVs, HEVs and PHEVs.
2. **Strong relation between the innovation strategy and the political strategy** of car manufacturers.
 Car manufacturers lobby for regulatory support for the innovations they are investing in, while opposing regulatory support for other innovations.
3. **As a consequence of the previous, car manufacturers through their corporate political actions oppose regulatory support for some TISs while advocating support for others.**
 Car manufacturers attack political support for innovations they perceive as a threat. To illustrate: in the early 2000s, car manufacturers advocated HFCVs as an alternative for the EVs they opposed, see Figure 2.
4. **The innovation and political strategies of car manufacturers become more diverse over time, see Figure 2.**
5. **Strong competition breaks the industry front of opposition towards zero emission vehicles.** There is strong competition not only in the innovation strategies of car manufacturers, but also in their political strategies.
 To gain competitive advantage, car manufacturers compete for public support for their innovations. In doing so they commit to different innovations and break apart the closed industry front that committed to incremental innovation (aICEVs) and from which they used to oppose low and zero emission technologies until the early 2000s.
5. **In line with Wesseling et al. (BSE) the data support that the more profitable car manufacturers focus on commercializing the less radical innovations** (more radical innovations on the right in Figure 2).

Figure 2, RD&D (in blue), commercial (in green) and political activities (in red) of car manufacturers regarding the TISs of low and zero emission vehicles



References

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Discussion

Are these findings applicable to other sectors and transition processes?