

## Topic: Strategic use of roadmaps to shape expectations about innovation

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Expectations play an important role in innovation, because actors guide their actions by expectations about future outcomes. Firms for example will only invest in innovation if they expect this to generate profits in the future. The profitability is however dependent on the actions of other actors in the innovation system that influence the success of the innovation, such as consumer preferences, policy support, infrastructure and the supply of necessary innovation inputs (both material and expertise). To safeguard their investments, firms may attempt to influence the actions of the actors in the innovation system by shaping their expectations (Bakker et al., 2011; Wesseling et al., 2014). Such influence is particularly important for innovations that depend for their commercial success on significant changes in the innovation system, i.e. *systemic innovations* like the hydrogen cars and solar panels.

Organizations can strategically influence the expectations of actors in the innovation system in two ways. To safeguard investments in innovation, organizations can on the one hand influence others' expectations regarding the innovation positively (Bakker, 2014). This is a proactive strategy (Wesseling et al., 2014) that contributes to system formation (Kukk et al., 2013). On the other hand, organizations can influence expectations about a certain innovation negatively because the innovation threatens their sunk costs in existing technologies; this is called a defensive strategy that contributes to destruction of the emerging technological innovation system.

The success of an innovation often depends on its policy support; policy makers will provide policy support when they expect these innovations to be technically feasible and to be able to meet societal demands (such as environmental sustainability, safety or material durability). To protect their aforementioned interests, firms are thus incentivized to shape policy makers' expectations about these technologies. Technology roadmaps are an instrument used specifically by policy makers to generate expectations about emerging technologies and serve as an important input to their policy making. Exploratory research however also suggests that these roadmaps are used by industry associations to protect their vested interests by creating very conservative expectations about the feasibility of clean technologies (Wesseling and van der Vooren, 2016). This phenomenon seems to be particularly prevalent in energy-intensive processing industries such as iron, concrete, paper and pulp, chemicals, glass and aluminium (*Ibid.*).

Further research is necessary to establish to what extent the strategic use of technology roadmaps harms the implementation of progressive policy interventions. This includes a multi-stakeholder analysis that compares the expectations of different actors as well as an assessment of the factors that influence policy makers' expectations regarding innovation.

### References

- Bakker, S., 2014. Actor rationales in sustainability transitions – Interests and expectations regarding electric vehicle recharging. *Environ. Innov. Soc. Transitions* 13, 60–74. doi:10.1016/j.eist.2014.08.002
- Bakker, S., Van Lente, H., Meeus, M., 2011. Arenas of expectations for hydrogen technologies. *Technol. Forecast. Soc. Change* 78, 152–162. doi:10.1016/j.techfore.2010.09.001
- Kukk, P., Moors, E.H.M., Hekkert, M.P., 2013. Institutional Power Play in Innovation Systems - the Case of Herceptin. *Res. Policy* 1–12. doi:10.1016/j.respol.2016.01.016
- Wesseling, J.H., Farla, J.C.M., Sperling, D., Hekkert, M.P., 2014. Car manufacturers' changing political strategies on the ZEV mandate. *Transp. Res. Part D-Transport Environ.* 33, 196–209. doi:10.1016/j.trd.2014.06.006
- Wesseling JH., Van der Vooren A. (In Press). Lock-in of mature innovation systems, The transformation towards clean concrete innovations in the Netherlands. *Journal of Cleaner Production*. <http://dx.doi.org/10.1016/j.jclepro.2016.08.115>