

Chapter 2

How to Build a Socio-technical Map

Abstract In this chapter we show how a socio-technical map (ST-map) can be built in four steps. Graphical examples are taken from the case studies presented in Chaps. 3–6 of this book. In step 1 the field of analysis is determined: this is usually a whole societal function, such as feeding, housing, mobility. In step 2 the relevant systems and niches and their networks of innovators are identified: the dominant system (if any), other systems, and niches are represented differently into the ST-map. Also local systems and niches—when relevant—can be represented in a specific way. In step 3 the two dimensions of the ST-map are drawn. The first dimension usually represents the relevant political discourses on sustainability, that is, how the current and future sustainability of the analyzed societal function is interpreted by innovators. The second dimension of the ST-map usually represents the techno-economic competences that are leveraged by innovators to promote change. These may refer either to business or productive models, or to technologies. In step 4 all ST systems and niches are positioned into the ST-map. Such a positioning represents to which political discourse and to which techno-economic competence mostly refers the network of innovators of any given system or niche. Also the dominant policy (if any) can be positioned into the ST-map. The resulting ST-map can be used to represent either the current situation of a societal function or its prospective or retrospective dynamics. In the latter case the history of a societal function can be represented through a sequence of ST-maps, each referring to a single moment of relative stability of the societal function. Starting from the current ST-map and from the analysis of the current potential for change also scenarios can be built: these are represented as the result of the ‘demography’ of ST systems and their supportive networks.

Keywords Socio-technical map • Socio-technical systems • Network of innovators • Political discourse • Scenario analysis

2.1 What Is the Socio-technical Map for?

As we have seen in the previous chapter, a sustainability transition (SusTran) is a complex process of system innovation involving both the techno-economic and socio-political dimensions of a societal function. Such a process is made possible by innovators that are able at the same time to foster cooperation (into a network supporting a ST system) and competition (between ST systems).

With the ST-map we pretend to provide the reader with a simple graphical tool that can be used to represent a SusTran without losing the understanding of its complexity. We think that the ST-map can be used by scholars, practitioners and policy makers as a tool both for the analysis of current and future system innovations, and for the design and implementation of strategies for sustainability.

In the following of this chapter we show how a ST-map can be built. Some graphical examples are taken from the case studies presented in Chaps. 3–6. We refer readers to these chapters for a deeper understanding of how a ST-map can be built and used in real cases.

2.2 How to Build a Socio-technical Map in Four Steps

Step 1—Determine what is the field of analysis

The socio-technical (ST) analysis of SusTrans usually applies to societal functions, such as feeding, housing, mobility, etc. It is just at such an overall level that societal changes generated by system innovations can be more easily analyzed and understood. In particular, all relevant political changes that make SusTrans viable take place at the level of societal functions (if not at the level of the whole society). When a ST-map is applied to societal sub-functions its analytic potential is reduced; e.g. in the case of lighting proposed in Chap. 6, it is apparent the risk to focus on techno-economic innovations, while political changes are mostly considered exogenous.

Societal functions—and all systems and niches that provide it—usually reproduce on multiple scales, that is, simultaneously at the global, national and local level. Moreover, the dynamics at different scales may show some misalignment. The ST-map is able to represent such a space complexity by combining the global picture with national/local specificities (see below, Step 2). The study of mobility in the city of Freiburg (D) (Chap. 5 of this book) shows that the ST-map can also be used to analyze how a societal function changes in a specific local area. These very local ST-maps are useful to understand why local configurations (dominant positions; systems and niches; policies; etc.) differ from global ones.

Step 2—Identify the relevant systems and niches and their networks of innovators

Once determined which is the societal function to be analyzed, it is usually easy to identify all systems that contribute to its provision, and—for each of them—who

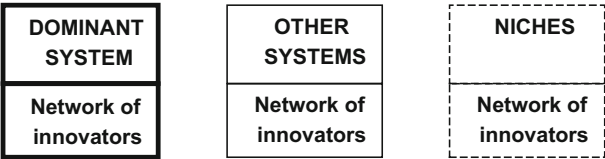


Fig. 2.1 Graphical representation of socio-technical systems and niches and their supporting network of innovators

are the main members of their supporting network of innovators. It must be remembered that innovators can be: Authorities, companies, other organizations (such as political or trade associations), grassroots movements, media, etc.

The dominant system (if any), other systems, and niches are represented differently into the ST-map (Fig. 2.1).

Also local systems and niches—when relevant—can be represented in a specific way. As shown in the examples taken from Chap. 4 (Figs. 2.2 and 2.3), in this case the graphical representation of the network of innovators is lost, and this information must be given in the accompanying text.

Step 3—Draw the two dimensions of the ST-map

The ST-map is framed by two dimensions.

Dimension 1 represents the relevant political discourses on sustainability, that is, how the current and future sustainability of the analyzed societal function is interpreted by innovators. The standard articulation of sustainability in its environmental, social and economic constituents should be remembered when looking for political discourses. Figure 2.4 provides examples taken from three of the following case studies to show how this dimension can be drawn: here political discourses are represented with a claim in order to make them more understandable to the reader.

Fig. 2.2 Graphical representation of a set of local systems of public transport

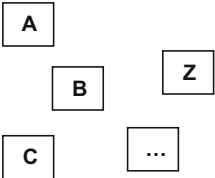
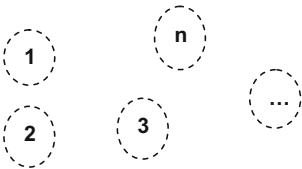


Fig. 2.3 Graphical representation of a set of urban niches of integrated mobility



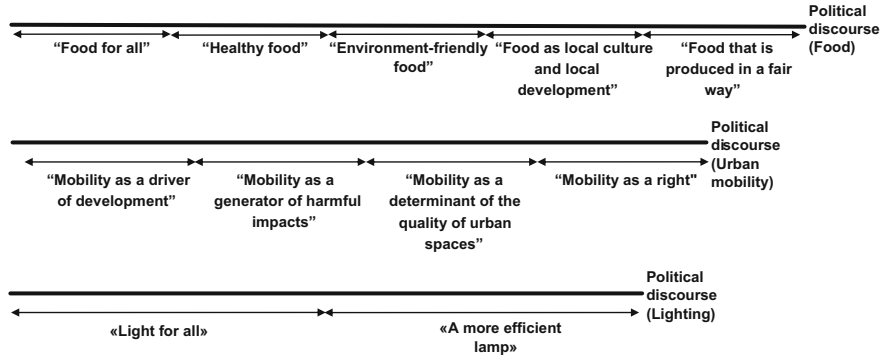


Fig. 2.4 Graphical representation of the dimension ‘Political discourse’. Examples taken from the case studies on food, urban mobility and lighting

Dimension 2 of the ST-map represents the techno-economic competences that are leveraged by innovators to promote change. As shown in the examples taken from the case studies presented in the following chapters, such competences may refer either to business or productive models (Fig. 2.5). In other cases, technologies may be considered.

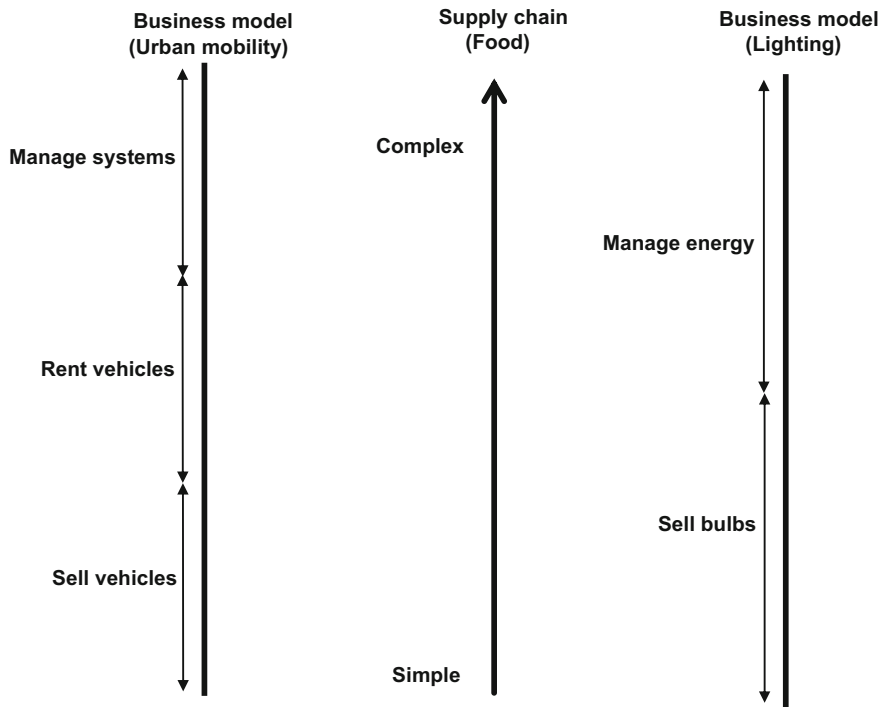


Fig. 2.5 Graphical representation of the dimension ‘Techno-economic competences’. Examples taken from the case studies on food, urban mobility and lighting

Step 4—Position systems, niches (and the dominant policy) into the ST-map

Systems and niches previously identified can now be positioned with reference to the two dimensions of the ST-map. Such a positioning represents to which political discourse and to which techno-economic competence mostly refers the network of innovators of any given system or niche.

Figure 2.6 represents the ST-map of the current situation of urban mobility (taken from Chap. 4). This example clearly shows that some systems (such as the individual car) are unequivocally centered on one political discourse and on one techno-economic competence; instead, other systems may refer to two political discourses (such as the individual bicycle) or to two techno-economic competences (such as some local sharing schemes). Things become more difficult to represent when a systems range between more than two competences or political discourses; a solution to this problem is provided in the ST-map of the societal function of feeding where most systems are able to manage supply chains featuring different levels of complexity (Fig. 2.7; taken from Chap. 3).

Also the dominant policy can be represented into the ST-map. Its positioning must be interpreted as that of systems and niches. It must be stressed that when the dominant policy is inside a system (usually the dominant one) that means that a networks of innovators has been able to influence (and possibly to “capture”) the political dimension of the whole societal function. See again Figs. 2.6 and 2.7 for graphical examples.

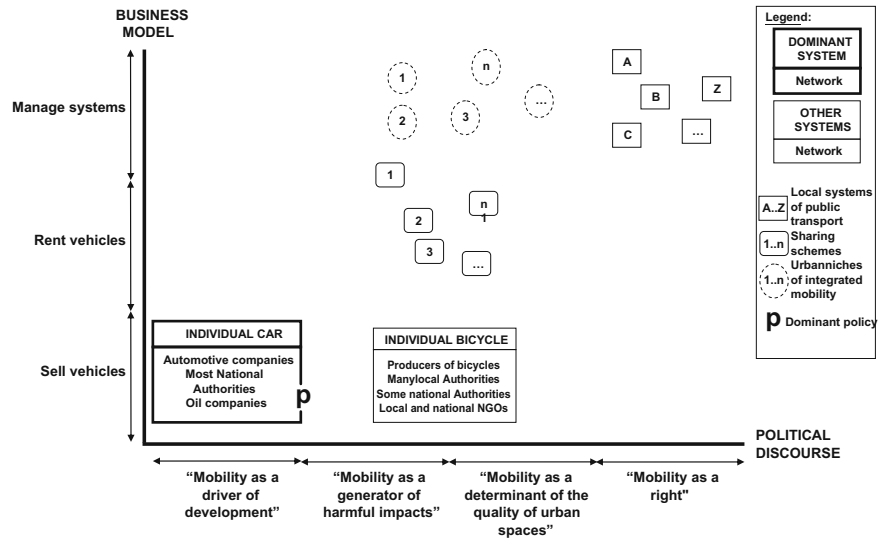


Fig. 2.6 The socio-technical map of urban mobility: current situation

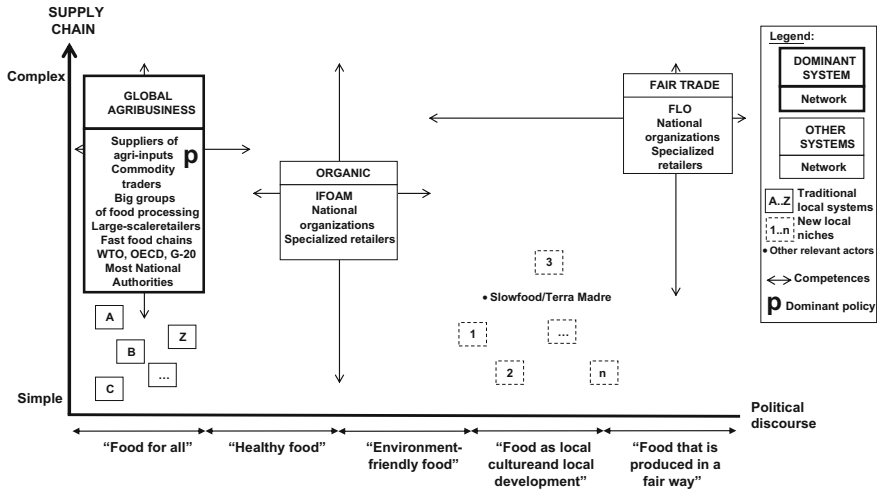


Fig. 2.7 The socio-technical map of feeding: current situation

2.3 From Maps to Transitions

The ST-map can be used to represent either the current situation of a societal function or its prospective or retrospective dynamics. In the latter case the history of a societal function can be represented through a sequence of ST-maps, each referring to a single moment of (relative) stability of the societal function. See Chap. 6 for a retrospective analysis of the lighting sector based on a sequence of five ST-maps spanning over the period 1880–2010.

Things are more complex when ST-maps are used to envisage the future evolution of a societal function. In these cases, the analysis of the current potential for change is used to build (usually more than one) scenario. Consistently with the ST approach to system innovation, such a potential is to be found in those ongoing techno-economic and political changes that can trigger and make viable the ‘demography’ of systems and their supportive networks. In particular, the result of the transition from current to future settings of the analyzed societal function can be represented in the ST-map as:

- the shift of existing systems and niches,
- the empowering of niches becoming systems,
- the empowering of systems becoming dominant,
- the disappearing of existing niches and systems,
- the destabilization (and possible disappearing) of dominant systems,
- the emergence of new niches and systems (possibly reaching a dominant position),
- the disappearing or emergence of a dominant policy,
- the entering of systems from outside the societal function,

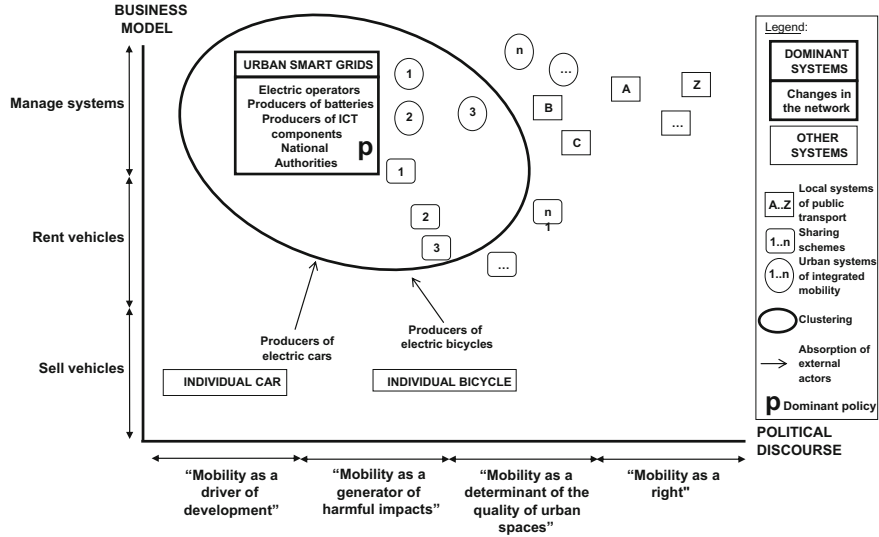


Fig. 2.8 The socio-technical map of urban mobility: 2030 ‘Electricity’ scenario

- the absorption of new members in a network of innovators (possibly coming from other systems or societal functions),
- the clustering of (either existing or new) systems and niches.

Figure 2.8 (taken from Chap. 4) represent one of the three alternative 2030 scenarios of urban mobility. Here the reader can see how the dynamics of absorption and clustering can be represented in a ST-map.

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