Quantitative Analysis of Technology Futures: Techniques, Contexts, and Organisations

Tommaso Ciarli, Alex Coad, and Ismael Rafols

SPRU, University of Sussex
Email: t.ciarli@sussex.ac.uk

Abstract

Technological progress has a huge impact on society and economic development, and improving our understanding of likely future developments of technology is of increasing importance. The goal of Future-oriented Technology Analyses (TFA) is to enable us to better understand where existing technological trajectories will take us, as well as deciding upon desirable future states and playing a role in 'creating' the future. FTA includes a number of activities that in the literature are most often indicated as technology foresight, forecasting, intelligence, roadmapping and assessment (Porter, 2010).

Our focus is on the quantitative techniques used in Future-oriented Technology Analysis. Quantitative techniques are increasingly important in our era of big data and increasing computational power, and enable us to better project into the future. New quantitative techniques such as webometrics and prediction markets are complementing existing techniques.
In this paper, we survey the techniques, collating them and discussing them in a synthetic fashion, guiding the reader 'through the maze'. We examine the tools and methodologies available, and discuss the contexts in which they are most widely used. More specifically, we selected 26 quantitative techniques, which are then grouped in 10 groups. We distinguish between their uses (Descriptive vs Prescriptive; Positive vs Normative; Data gathering vs Inference; Foresight vs Forecast) and also look at their characteristics (Drivers; Locus; Time horizon considered; Purpose; and Participation). These techniques are arranged and organized in summary Tables.