

# **A GENERALIZED NK-FRAMEWORK TO STUDY THE CO-EVOLUTION BETWEEN INDUSTRY DYNAMICS AND ARTEFACT'S ARCHITECTURE**

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The evolution of industries can be analysed from different perspectives. Notwithstanding all of them are linked to firms' effort to win market competition, each discipline tends to highlight specific aspects of this picture. Economic accounts place the focus on the life cycle of products and the related industry demography dynamics, leaving search and innovation on the back burner. On the contrary, studies in the management and innovation traditions present rich investigations of search strategies in complex environments while maintaining on the background the consequences for the whole industry. As these phenomena represent two faces of the same coin, a full understanding of the forces underpinning them calls for a framework able to connect the different aspects. To this end, the paper puts forth a novel product life-cycle model based on a generalised NK model (Altenberg, 1994; Frenken, 2006) in which firms compete for consumers by improving their products' performance through changes on their architecture. In particular, by means of a parsimonious structure, the framework hereby presented can replicate four stylised facts emerging from the literatures belonging to different traditions: (i) product diffusion, (ii) industry shakeout, (iii) modularity in product design, and (iv) increments in the size of products. The results of the simulations highlight that the degree of polarisation of consumers' preferences over product's functions plays an important role in generating not only the evolution of market shares and market concentration but also the degree of modularization of artefacts' architecture. Moreover, the stylised nature of our framework allows for a multitude of extensions to study the co-evolution between firm's strategy, market dynamics, and technology.