Enhancing the theoretical framework behind the integration of system dynamics and agent based modelling for use in pharmaceutical systems

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A novel view for an integrative SD and AB modelling framework for use in pharmaceutical systems is proposed. This is centred around the key concepts of resources, agents and information imperfection and is supported by the theoretical perspectives of resource-dependence theory and resource based view, behavioural decision theory, information economics theory and anticipatory systems theory. Each of the above theoretical perspectives provides different knowledge and explanations of socio-economic phenomena and integrating them provides a more holistic view for critically exploring and interpreting market resource and agent interrelated behaviour. Conceptualizing the pharmaceutical market as an anticipatory adaptive socio-economic system emerging out of agents heuristic rules and forward-looking behaviour, competing for limited resources within an informationally imperfect market environment, would further complement the general systems and complex adaptive systems theoretical frameworks underpinning the practical integration of SD and AB modelling approaches. The proposed theoretical framework will be illustrated in the context of the External Reference Pricing regulation on the pharmaceutical market in EU. The analysis focuses on the relevant market agents and market resources involved, the main information imperfections and related phenomena that could lead to market imperfections and market failure from the public healthcare perspective of providing equitable and timely access to affordable medicinal products The resource/agent/information integrated framework proposed here contributes to the ongoing efforts of the modelling and simulation community to develop an enhanced epistemological paradigm in support of the integration of SD and AB methodological approaches. Another practical contribution is to the call of the European Council for a systemic evaluation of the pharmaceutical regulation in EU and associated pharmaceutical market system effects.