Agent-Based Modelling Incorporating Qualitative and Quantitative Methods: A Case Study Investigating the Impact of E-commerce upon the Value Chain

Richard Ian Taylor
Centre for Policy Modelling
The Business School
Manchester Metropolitan University

Abstract

This thesis investigates the question of how new e-commerce technology is changing the organisational structure of value chains. The research presented in this thesis illustrates a new methodology that unites qualitative and quantitative approaches, by undertaking a detailed case study within a major international organisation. The focus is upon exploring those issues identified as interesting and important by a small stakeholder group working in the company and actively participating in the research.

The qualitative investigation involves an interpretive study of interview data collected during a fieldwork phase. The context of the case study is a business transformation programme due to the introduction of Internet-based e-commerce that is designed to link customers to an electronic mall, thereby improving information flow, customer service, and internal efficiency. The qualitative research aims to capture the attitudes, perceptions and behavioural patterns observed in customers and other trading partners. The quantitative approach is embodied in an agent-based simulation model, which produces numerical outputs that are compared with statistical data gathered during the fieldwork. The objective is to develop an explanatory model that can be used to improve stakeholders' understandings of the workings of the value chain.

Simulation experiments are carried out to investigate a number of projected system scenarios, and to test hypotheses about the impact of e-commerce drawn from the literature and from the findings of other e-commerce case studies. The main findings of this research relate to the anticipated role of intermediaries in the value chain, and to the identification of key drivers and inhibitors to customer take-up of e-commerce. The thesis argues that a multi-methodology approach is appropriate to simulation-based projects. It identifies stakeholder participation as being particularly useful because it enables strong validation procedures to be carried out.

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