

# Knowledge networking within complex business systems

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A thesis submitted for the degree of

Master of Engineering

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## Certificate of authorship

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

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## Abstract

Within the last few decades, Information and Communication Technologies (ICTs) have transformed business, prompting the evolution of a more complex and dynamic digital environment. Today, organisations exist within a networked, diverse and *emergent* ecology; a transformative landscape demanding continuous adaptation and innovation. While many businesses are still coming to terms with the impacts of the first Internet revolution, a new collective breed of interactive, online social ICTs called *Web2.0* threatens to again alter the rules of engagement. No longer serving functions of mere utility, the new Internet platform is now being employed to extract more value out of everyday human interactions. It promises to improve personal networking and relationships, stimulate the exchange of ideas and values, amplify personal opinions, build reputations and catalyse the development of new products and services. By fostering the socialisation of experience and the exchange of user-generated content deeply seeded within personal judgements and contexts, *Web2.0* is stimulating what could be argued as knowledge (and not just information) transfer. Subsequently, online social ICTs are transforming members of general society into active participants in the genesis of new value, a usage pattern employing tightly-coupled interactive technologies to promote purposive business progression in structure (form), function and behaviour.

However, the interactive Internet platform is in its infancy, with little in the way of a tailored theoretical framework available for directing such *complex digital business systems*' design. Consequently, knowing what, where and how to employ new Internet technologies to assist business development and innovation is an ambiguous endeavour. Many *Web2.0* technologies and approaches are somewhat new and most are employed in close correlation to business models and modes of operation. To help comprehend the intricacies of this participative organisational reality, this thesis adopts an exploratory and reviewing approach, synthesising the multidisciplinary *complexity sciences* literature to produce the theoretical framework of Complex Business Systems (CBS). Offering an alternative ontological perspective for business systems development, this framework accommodates the relative interconnection and influence of *self-reflective* human agents within the

ever-construction of organisational and market outcomes. Finally, preliminary steps toward a demonstration of the suitability of the CBS framework as a heuristic guideline underpinning the analysis, design and development of *complex digital business systems* is performed, by employing it toward an *online knowledge networking* application within the Small to Medium Enterprise (SME) space. Early indications are that the CBS framework offers tremendous insight into both requirements selection and the design of interactive, online social ICTs.

## Acronyms

<b>AJAX</b>	Asynchronous Javascript and XML.
<b>AR</b>	Action Research
<b>AS2</b>	Applicability Statement 2
<b>B2B</b>	Business-to-Business
<b>B2C2B</b>	Business-to-Consumer-to-Business
<b>B2P2B</b>	Business-to-Professional-to-Business
<b>BPR</b>	Business Process Reengineering
<b>C2C</b>	Consumer-to-Consumer
<b>CAS</b>	Complex Adaptive System/s
<b>CBS</b>	Complex Business Systems/s
<b>CCoPs</b>	Customer Communities of Practice
<b>CoPs</b>	Communities of Practice
<b>CRM</b>	Customer Relationship Management
<b>DBE</b>	Digital Business Ecosystem/s
<b>ENoPs</b>	Electronic Networks of Practice
<b>FBS</b>	Function–Behaviour–Structure
<b>GDP</b>	Gross Domestic Product
<b>IC</b>	Intellectual Capital
<b>ICT</b>	Information and Communication Technology (and/or systems)
<b>MMS</b>	Multimedia Messaging Service
<b>OKNA</b>	Online Knowledge Networking Application
<b>P2C2P</b>	Professional-to-Consumer-to-Professional
<b>P2P</b>	Processional-to-Professional
<b>PCE</b>	Principle of Computational Equivalence
<b>POTS</b>	Plain Old Telephone Service

<b>RSS</b>	RSS covers various versions of a number of different technologies including ‘Really Simple Syndication’ and ‘Rich Site Summary’
<b>SaaS</b>	Software as a Service (also Sales as a Service)
<b>SEO</b>	Search Engine Optimisation
<b>SME</b>	Small to Medium Enterprise
<b>SMS</b>	Short Messaging Service
<b>SNA</b>	Social Network Analysis
<b>SSM</b>	Soft Systems Methodology
<b>V&amp;V</b>	Validation and Verification
<b>XML</b>	Extensible Markup Language

## **Keywords**

Autopoiesis, Allopoiesis, Bifurcation, Business ecology, Coevolution, Cognitive complexity, Complex adaptive system, Complex business system, Complex control parameters, Complex digital business system, Complex digital economy, Complex human systems, Complexification, Complexity sciences, Communities of practice, Dissipative structures, Dissolvence, Emergence, Far-from-equilibrium, Hyper-competition, Knowledge creation (innovation), Knowledge management, Knowledge worker, Machine complexity, Online knowledge networking, Reflective consciousness, Self-determination, Self-organisation, Self-organising complexity, Self-reflective complexity, Self-similarity, Static complexity, Synergistic phenomena, Systematic, Systemic, Teleconomy, Web2.0.

## **Document conventions**

The following conventions are used within this thesis:

- |            |  |
|------------|--|
| ‘abc’      | Denotes a colloquialism or concept.                                |
| <i>abc</i> | Denotes a defined term, keyword or emphasis.                       |
| <u>abc</u> | Used for internal section references.                              |
| Title Caps | Refers to a named framework e.g. the Classification of Complexity. |

Additionally, the terms ‘organisation,’ ‘organisational system’, ‘business system’, ‘organisational business system’, ‘complex business system,’ ‘enterprise’ etc. are used interchangeably throughout this thesis.