



Research opportunities in the regulatory aspects of electronic markets

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Abstract

Regulation has not been a primary focus of research within the information systems discipline or the research domain of electronic markets. A framework is presented to support understanding of the field. A review of published works has established that many research opportunities exist. The usefulness of the framework is validated by means of an examination of the platform-based business sector, with particular reference to Uber.

Keywords Regulatory hierarchy · Stakeholders · Researcher perspective · Users · Uses · Platforms

Introduction

Dictionary definitions of ‘regulation’ include ‘governance of behaviour or practice’, ‘control, governance, direction’, ‘adjustment with reference to some principle, standard, or norm’, ‘alteration in response to a situation, set of circumstances’ and ‘assurance of proper working’.

In biology, natural processes are subject to other natural processes whose effect is to limit, control or regulate them. Observations of biological processes gave rise to General systems theory (von Bertalanffy, 1940, 1968). During the industrial revolution, Watts’ steam or ‘fly-ball’ governor ushered in the era of automated control of human-made processes by other human-made processes. From this, the insights of cybernetics emerged, whereby sensors provide feedback that enables a controller to monitor a process, effectors enable the controller to influence the process, and successive levels of nested controllers enable complex systems to be managed (Wiener, 1948).

Electronic markets are not biological or industrial in nature, but rather economic and social systems. In an unregulated state, one entity has a negative effect on the interests of a second entity. When regulation is applied, on the other hand, the second entity is the beneficiary of the existence, power and actions of a third entity, commonly called a ‘regulator’, which influence the behaviour of the first entity, referred to as the ‘regulatee’.

In an article on ‘Twenty years of electronic markets research’ (Alt & Klein, 2011), the Editor of this journal remarked that regulation was an enabler of electronic markets, through institutionalisation of the transaction environment, including market access, “the availability of monitoring and enforcement mechanisms (e.g. protection against insider trading) as well as legal functions that determine contract law, dispute resolution, and the transfer of property rights” (p.46), but was also a source of “administrative burdens” (p.49).

Yet, despite the quite apparent relevance of regulation to information systems generally, there is a remarkable paucity of research on regulation in specific market segments such as M-Payments (O’Reilly et al., 2012), in the broad eInteractions area addressed by the Bled eConference 1995–2012, where regulation “was not a sufficiently significant topic to justify mention among the 33 most important keywords” (Clarke & Pucihar, 2013, p.272), in electronic markets, where “we are still missing good theory that connects regulation to the phenomenon of electronic markets” (Timmers interview in Alt & Zimmermann, 2014, p.238), in energy markets where there is “potential for IS scholars to engage in issues related to the regulation and design of energy markets” (Kranz et al.,

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2015, p.13), in inter-organisational IS generally where “previous IOIS adoption research ... has largely limited its focus on inter- or intra-organizational factors to the neglect of industry-specific and regulatory requirements” (Wallbach et al., 2019, p.708), and in IS contexts more generally (Eggert et al., 2013).

EM’s Editor returned to the question in the Introduction to a Special Issue on FinTech, reporting that “a brief analysis undertaken on Google Scholar confirmed the impression of only limited available research in the RegTech domain. This is remarkable since legal and regulatory requirements and checks have accrued in view of the growing regulation that has occurred in the financial industry after the financial crisis of 2008” (Alt et al., 2018, p.241). As will be shown later in this article, there are signs that this oft-repeated exhortation is slowly attracting attention.

The purposes of this article are to examine the treatment of regulation in electronic markets research, and propose and evaluate a research framework intended to support more intensive work in the area. An enormous amount has been written on regulation. The work reported here is limited in scope to research into electronic markets, primarily within the information systems (IS) discipline and IS-cognate disciplines, although with some material drawn from salient publications in other disciplines.

The notion of regulation is broad. Among other considerations, it encompasses internal controls within organisations and external controls over organisations’ behaviour. Internal controls have been the subject of considerable research over the last five decades, under such headings as operational controls, accounting information systems, EDP/IS audit, data security and IT governance. External regulation, on the other hand, has attracted much less attention.

The research builds on prior work by the author in regulatory aspects of information technology, strategic information systems theory, researcher perspective theory, and electronic markets. Prior literature reviews were revisited and updated, and new searches undertaken in various sub-areas. Bodies of theory and practice relating to regulation were summarised, and key dimensions of the field identified. Structures were postulated that presented the key elements within each of the dimensions in a manner intended to be readily grasped by information systems researchers and practitioners. Elements of the framework have been previously applied in relation to drones (Clarke & Bennett Moses, 2014) and artificial intelligence (Clarke, 2019b), and an application of the full framework in the field of privacy protection is in Clarke et al. (2021).

Particular attention was paid to the category of regulatory mechanisms which make up what is referred to in the work as ‘infrastructural regulation’. This has not been a focus of attention in the past, but has emerged as a sub-field of importance because of the rapid growth of so-called ‘RegTech’ services. The resulting framework was used as a lens through which to

assess samples of the literature on electronic markets, in particular the >500 articles published to date in the journal of that name. The contemporary architecture referred to as ‘technology platforms’ was identified as a relevant topic-area. A specific platform was selected as appropriate subject-matter to which to apply the framework. An evaluation was performed of the framework’s usefulness for the purpose of analysing the regulatory regime applicable to that particular industry sector and platform.

The article commences by considering existing literature relating to regulation, with particular focus firstly on the longstanding topic of strategic information systems and then on the recently-emerged field of RegTech. It next proposes a framework for identifying research opportunities in relation to regulatory aspects of IS. The extent to which those opportunities have been grasped in the electronic markets context is assessed, by examining relevant published articles, particularly in this journal, but cross-checked against three other venues. Finally, to validate the usefulness of the framework, it is used as a lens through which to observe the recently-popular notion of platform-based digital marketplaces, with particular reference to Uber.

Regulation in information systems theory

Regulatory mechanisms have many impacts at the tactical level of organisational structures and processes, and hence on many aspects of information systems design. The present article adopts a broad view, and hence concerns itself primarily with large-scale impacts. For these reasons, the appropriate starting-point in reviewing the literature is the field of strategic information systems theory.

It was recognised that regulation has strategic impacts even during the early years of strategic IS research. External controls were, however, originally regarded almost exclusively as a constraint rather than as an opportunity. For example, among the 14 considerations in the ‘Organizational strategy set’ of King (1978) was “organization must be responsive to regulatory agencies”.

Porter’s work on competition and corporate strategy (1980, 1985) has been highly influential. Despite mentioning “government policy” in eight locations, Porter’s books treat government actions as having impacts on business that are almost entirely negative, with only reduced regulation and subsidies mentioned in a positive manner. Porter’s theory overlooks the ways in which regulatory measures definitively shape some industries, e.g. through legislated monopolies and oligopolies maintained by very high entry barriers such as licensing requirements. Porter’s theory also fails to recognise that both the fact of regulation, and its nature, can create scope for competitive advantage. In practice, corporations are adept at ‘regulatory arbitrage’ (architecting business structures and processes

to circumvent regulatory measures – Fleischer, 2010) and ‘jurisdictional arbitrage’, also referred to as ‘forum shopping’ (arranging the jurisdictional location of business operations to avoid inconvenient regulatory measures – Whytock, 2011).

To provide an indication of the incidence of research reports that have meaningfully addressed regulation, a scan was undertaken of the archives of the Journal of Strategic Information Systems for uses of <regulat* > in title, abstract or keywords. Although about 15% of the close to 1000 articles contain such strings, only 14 articles were found that made more than a fleeting mention of any of the relevant terms (1.5%). Of those, 12 considered regulation as a constraint, 1 as a cost, and only 6 as an opportunity (0.66%). Only 5 had regulation as a major focus (Neo, 1992; Williams, 1994; Hosein and Whitley, 2002; Butler, 2011). Further, only 10 contained the word ‘regulator’, and only 1 of those adopted the perspective of the regulator (Hosein & Whitley 2002). Searches using a variety of other terms indicative of a focus on regulation identified no further candidate articles.

Such blindness to the potentially positive strategic effects of regulation may reflect the origins of both Porter’s theory and several other influential works in the area. They came out of the Harvard Business School and its case studies of US enterprises, in contexts in which government regulation was, and remains, very meek. Driven by this worldview, the IS literature has continued to wear blinkers. Farbey et al. (1995) referred to “regulatory or legal necessity” (p.42). See also Fisher and Harindranath (2004) and Greenaway et al. (2015). Moreover, some studies have even extended beyond discussions of regulatory compliance to actively consider its subversion (Henry et al., 2007).

Yet impacts of regulatory regimes on strategic IS can be not only significant, but also enabling and even positive (Bons et al., 2012; Eggert et al. 2013; Kranz et al., 2015). One example is where regulatory measures provide comfort to the individuals and organisations that buy products and use services. This contribution to trust arises from the feeling that the buyer’s risks are reduced, and that recourse is available when things go wrong (Clarke, 2001; Tang et al., 2008; Tsatsou et al., 2010; Xu et al., 2012; Wall et al., 2016). The aura of trustworthiness can be sustained by a mix of careful handling of issues as they arise and management of media and government relations. Further, to the extent that regulators take enforcement actions against corporations that fail to fulfil their compliance obligations, the negative impacts of maverick competitors can be reduced, and the positive images associated with mainstream providers can be enhanced.

In addition, regulatory measures can create or strengthen barriers to entry by competitors (Lane & Koronios, 2001; Klapper et al., 2006), and can increase barriers to exit by customers. A common example is the obligations imposed on financial institutions in many countries, including the USA, UK, Canada and Australia, to ‘Know Your Customer’, i.e. to

gather a considerable amount of data about the person or organisation, and to conduct identity authentication processes. These represent a barrier to entry, in that new providers have to invest considerable time and money on compliance, as a condition of doing business. Further, users of these companies’ services are confronted by onerous and time-consuming documentary requirements in order to establish a relationship with each alternative or additional provider, and these high switching costs naturally reduce customer churn.

In some sectors, regulatory arrangements can strongly influence and even dictate industry structures and processes. This has occurred in the many countries that have diluted or withdrawn the monopoly rights of PTTs (postal, telephone and telecommunications agencies) and electricity, water and gas utilities (Hulsink, 1999).

During the last few years, some governments have adjusted regulatory settings by means of an initiative commonly referred to as ‘Open banking’ (Dratva, 2020), although promoted in at least Australia and New Zealand as a ‘Consumer data right’ (ACCC, 2018). The leader in the open banking movement has been the UK Competition and Markets Authority (CMA). The CMA’s retail banking market investigation concluded that older and larger banks do not have to compete hard enough for customers’ business, and smaller and newer banks find it difficult to grow. This means that many people are paying more than they should and are not benefiting from new services. “To tackle these problems, the CMA is implementing a wide-reaching package of reforms. ... The key measures, which will benefit personal and small business customers, include: Requiring banks to implement Open banking by early 2018, to accelerate technological change in the UK retail banking sector. Open banking will enable personal customers and small businesses to share their data securely with other banks and with third parties ...” (CMA, 2016). This regulatory measure is expressly designed to facilitate competition by reducing the barriers to customer exit, enabling new entrants to beat down excessive revenue-margins and build market-share. As a result, de- and re-regulation activities are again emerging as significant drivers in the financial sector, and in some other areas such as energy.

When changes occur, and especially major changes such as privatisation, de-regulation and re-regulation, organisations that are well-prepared for events can acquire large market-shares in new or re-defined industry segments, and can take advantage of new revenue-sources or government subsidies. Rukanova et al. (2009) studies international trade, Watson et al. (2010) investigates opportunities in the environmental protection and energy sectors, and Rai et al. (2015) recognises that regulatory measures are determinative of industry structure in the electricity industry.

A particular form of disruptive IT has been much-discussed during the period 2015–20. The term ‘RegTech’ appears to have been first published in a UK Government report of

March 2015 on financial technologies (UKGOS, 2015), sometimes referred to as the Blackett review. The term ‘FinTech’ had been used within the financial services sector, and RegTech was initially applied to “regulatory reporting and analytics infrastructure ... typically to improve efficiency and transparency [in financial regulation]” (UKGOS, 2015, pp.12, 47). A slightly different but also narrow approach was adopted by the UK Financial Conduct Authority (FCA): “RegTech is a sub-set of FinTech that focuses on technologies that may facilitate the delivery of regulatory requirements more efficiently and effectively than existing capabilities” (FCA, 2016, p.3).

It is only natural for the idea to loom large for financial services corporations. One reason is that the industry has borne the brunt of frequently-changing interventions by legislatures and law enforcement agencies under the pretext that, provided the public accepts that every financial transaction must be identified and monitored, then, in succession, organised crime, the drug trade, human trafficking, terrorism and child pornography will all be magically defeated (Zagaris, 2004; Gilmore, 2004). Another reason is that the ‘global financial crisis’ of c. 2007–08 came at severe economic and social cost, because soft forms of regulation failed spectacularly. This resulted in the imposition of substantial additional regulatory measures on financial services organisations.

The financial services industry will inevitably remain an important focus. RegTech’s potential scope is, however, far wider than that. Other industry sectors are also subject to formalised regulatory requirements, and business processes in those sectors can also benefit from technological support.

The earliest mentions of ‘RegTech’ found by Google Scholar are in 2015. The early academic papers tended to adopt narrow, FinTech-specific definitions as their starting-point (e.g. Arner et al., 2015; Daley & Butler, 2018; Anagnostopoulos, 2018; Currie et al., 2018). A review of 55 articles on financial services RegTech, from diverse sources outside the IS discipline, confirmed a strong orientation towards compliance, and an even stronger fixation of suppliers on compliance-related applications (Becker et al., 2020). IS has been slower to move than other disciplines. In early 2020, the AIS eLibrary’s collection of 16,000 refereed articles contained only 1 mention of the term, proposing a particular form of RegTech (Moyano & Ross, 2017). By the end of 2020, this had been joined by a second, a case study of a particular application (Gozman et al., 2020). Searches were also performed in the ‘Basket of 8’ IS journals, as determined by the Association for Information Systems (AIS, 2007). Most journals returned zero hits for <RegTech>. In early 2020, only three papers were located, two in JIT (Siering et al., 2017; Currie et al., 2018), and one in JMIS (Gomber et al., 2018). No additional works on the topic appeared during 2020.

The initial purpose of the UK FCA was to improve the quality and efficiency of regulatory processes, to benefit

regulators, although with side-benefits for regulatees. Buckley et al. (2020) note the intertwining of several threads in the development of RegTech within Europe, including reporting requirements, data protection, open banking and digital identification. As more attention gradually comes to be paid to RegTech in the IS and cognate literatures, it appears likely that there may be strong emphasis on RegTech as a means whereby regulated corporations can satisfy their compliance obligations less expensively, and little emphasis on benefits for regulators and beneficiaries.

The alternative conception of RegTech adopted in this article encompasses applications of technology that support any aspect of regulation. This includes the activities of legislatures and regulators, the compliance work of regulatees, and actions in support of the interests of the beneficiaries of regulation. This broader definition brings the whole universe of regulation within RegTech’s scope.

This section has reviewed some key aspects of IS theory relevant to regulation, and established that regulation topics are not strongly represented in published research within the discipline. To what extent are the roles played by regulation in large-scale change reflected in research in the specific domain of electronic markets? In order to address that question in the main body of this article, the following section presents a research framework.

A framework for regulatory research in electronic markets

The nature and purposes of a framework

In an unrefereed working paper (Clarke, 2018), the author reported on the development and exposition of a framework whereby IS professionals and academics can properly understand regulatory regimes, can identify opportunities for the development and deployment of RegTech, and can conceive, design and deliver appropriate technological support to relevant organisations. The framework draws on multiple published sources, and from the author’s consultancy experience in the field. It is a proposition whose effectiveness in structuring the representation of particular sectors and business models needs to be evaluated. A refereed paper applying the framework to privacy protection has been presented to a specialist Brussels-based conference outside the IS discipline (Clarke, 2021). However, this is the first expression of the framework in the IS-cognate literature.

This section provides a necessarily very brief rendition of that framework. The following sections then evaluate it as a means of considering the prospects for regulatory research in IS generally, and in electronic markets specifically. The framework is intended to be comprehensive, encompassing all of the many different mechanisms that play a role in

influencing the behaviour of actors within the relevant domain. A key benefit that the framework offers researchers is to ensure that all factors that may be relevant to their analysis are within their field of view as they conceive, structure and perform their work.

During the pre-theoretic phase in a new sub-field of IS, a research framework provides structure to themes and issues, including descriptions of fundamental concepts and processes (Wand & Weber, 2002; Avgerou, 2008; Newell & Marabelli, 2015; Clarke, 2019a). The framework presented here comprises several segments that articulate the space to which a regulatory regime applies. The next sub-section deals with the mechanisms whereby regulation is achieved, organised into layers. The following sub-section is concerned with the categories of players – distinguishing regulators, regulatees and beneficiaries – the relationships among them and the plays that they make. In the third sub-section, the important question is addressed about which of the various stakeholders’ perspectives the researcher selects as the viewpoint from which to observe the phenomena.

The layers of regulatory mechanisms

The space is usefully partitioned, by distinguishing the **Layers** within which regulatory mechanisms are commonly conceived. The approach adopted here reflects, but varies, the Braithwaite-Drahos model (Ayres & Braithwaite 1992; Drahos, 2017; Drahos & Krygier, 2017). The highest levels of Fig. 1 depict the formal alternatives, and beneath that are

shown the self-governance alternatives, and two forms of systemic governance.

The work of Baldwin et al. (2011) provides comprehensive reviews of the upper five layers, but has limited emphasis on the lowest two layers, referred to here as Systemic Governance. In the most fundamental Layer (1), Natural Regulation, are features of the space that have a regulatory effect, such as competition for limited resources forcing up market value, and reputational factors. Natural regulatory mechanisms can be harnessed and reinforced, providing relatively efficient ways to affect the behaviour of Players in the space.

Of particular significance for the IS discipline is Layer (2), Infrastructural Regulation. Regulatory functions can be performed by physical artefacts, such as the mechanical steam governor. IT can be harnessed to the same purpose. A highly-cited expression of this is ‘West Coast Code’ (Lessig, 1999; Hosein et al., 2003). This involves features of the infrastructure supporting or reinforcing positive aspects of the relevant socio-economic system, and precluding or inhibiting negative aspects. Those features may be byproducts of the artefact’s design, or they may be retro-fitted onto it, or architected into it. A simple example is the prevention of a transaction from being conducted until particular data has been entered and authenticated. Many forms of RegTech are embedded within services, and hence are exemplars of Layer (2), Infrastructural Regulation.

The mid-layers relate to the various forms of self-governance by individual organisations and by sectors as a whole. The uppermost layers are the realm of legislatures and regulatory agencies.

Players and plays

The next segments of the framework articulate the categories of Players that act within the regulatory space, and the dynamics within that space, that is to say the categories of Play that they engage in as each actor seeks to satisfy its own interests. Fig. 2 builds on the generic set of regulators, regulatees and beneficiaries, identifies key inter-relationships among the players, and embodies a sufficiently rich model to support analysis of complex real-world environments.

The uppermost domain shows the context within which Regulators operate, including a legislative body, a responsible agency and perhaps multiple policy agencies, together with consultancy support and outsourced services. The second domain shows the suite of entities that work with Regulatees, including in some circumstances an intermediary regulator (e.g. a stock exchange, through its listing requirements and market surveillance activities). The behaviour of Regulatees is also affected by standards organisations, and by certification schemes that provide such signals as ‘privacy seals’, referred to here as ‘Meta-Brands’. Depending on the sector, the

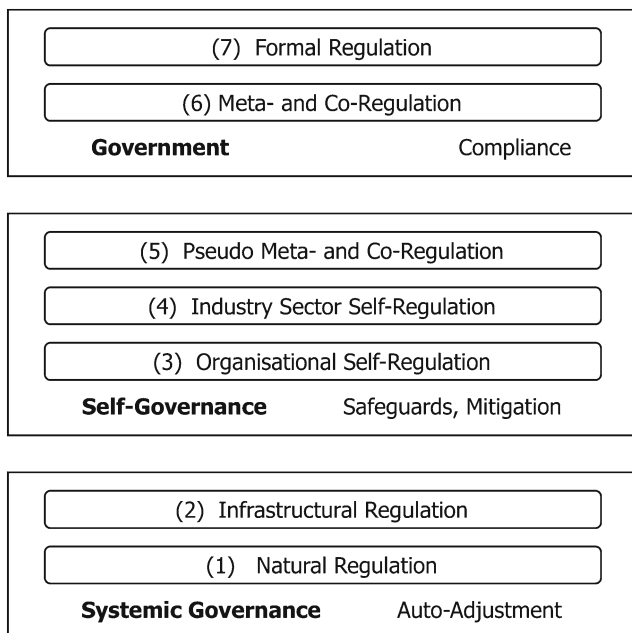
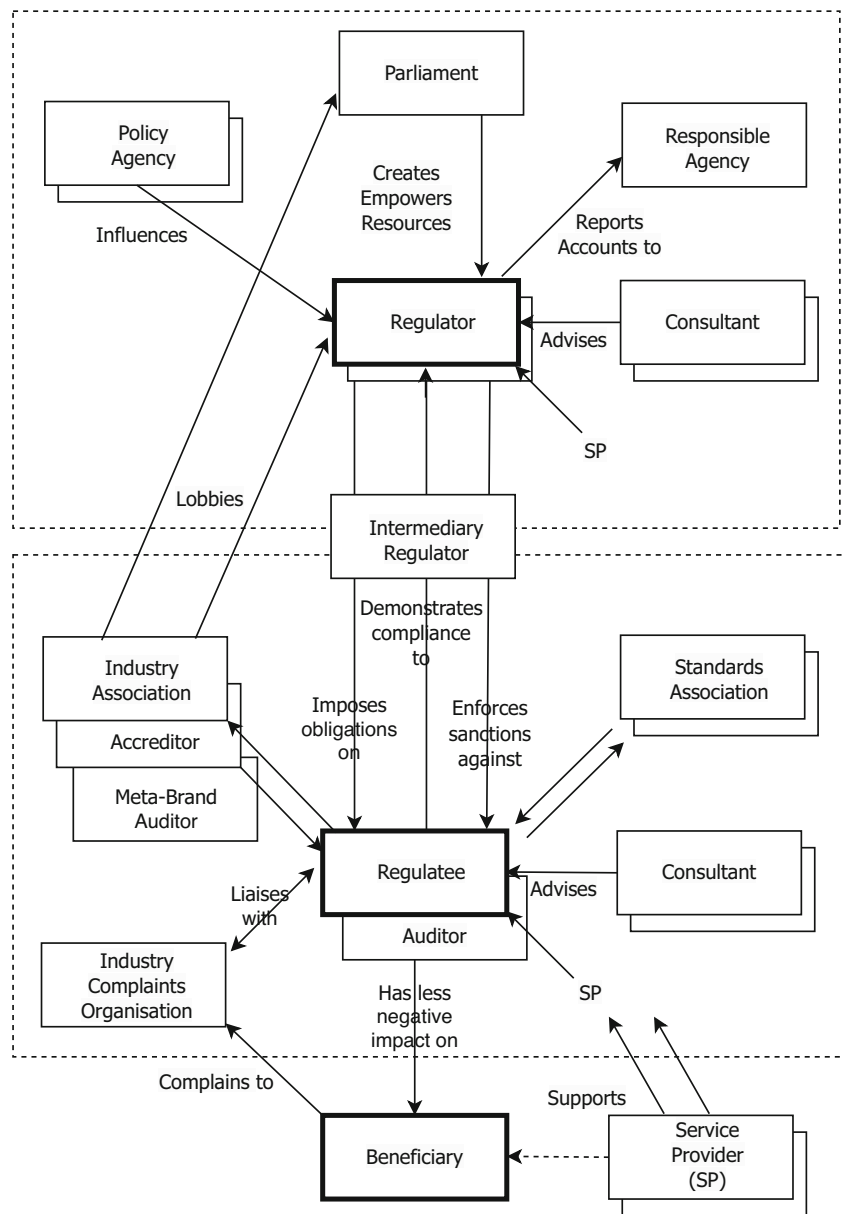


Fig. 1 A hierarchy of regulatory mechanisms

Fig. 2 Players in regulatory schemes



Beneficiaries of a regulatory regime may be employees, consumers, small business, or business enterprises generally.

The combined understanding of the regulatory space that is afforded by these segments of the framework, encompassing the Layers, Players and Plays, provides the foundation for description, interpretation and critical analysis of the comprehensiveness, effectiveness and efficiency of a design, and assessment of its likely impact and implications. The framework also enables not only policy-makers, but also IS executives, practitioners and academics, to perform the ‘sense-making’ activities that necessarily precede the conception, design, development and deployment of new IS, and the adaptation of existing IS.

Researcher perspectives

As was emphasised earlier, this article is concerned less with the reasonably well-researched area of organisation-internal self-regulation, and much more with external regulation of organisations. This inherently involves **Stakeholder interests** well beyond the organisation itself and constitutes a further segment of the research framework. This sub-section provides an overview of a recent exposition of the theory of researcher perspective in Clarke and Davison (2020).

Empirical research, concerned with real-world phenomena, involves carefully-conducted observation of some object of study within a context. That context involves multiple entities, each of which perceives the phenomena in their own way. A

common term used to refer to those entities is ‘stakeholders’ (Freeman & Reed, 1983), hence:

A Stakeholder perspective is the viewpoint adopted by a stakeholder in a particular activity, reflecting that stakeholder's perception of phenomena within the relevant context, the stakeholder's value-set, and the interests that the stakeholder seeks to protect and advance

When changes occur, each stakeholder observes them from their own particular viewpoint, and seeks to protect and advance their own interests. The actions of, and interactions among, stakeholders may have a significant impact on the outcomes. Hence a researcher who seeks to present credible research, even merely describing phenomena let alone predicting or making normative judgements about behaviour, needs to achieve a sufficient understanding of the relevant stakeholder perspectives.

The central proposition of researcher perspective theory is that research is seldom conducted in a holist or universalist manner, reflecting the interests of all stakeholders at once. It is very challenging for a researcher to convincingly claim omniscience. It is accordingly much more common to adopt the perspective of one party, or the perspectives of a small number of the parties, involved in or affected by the events. Hence:

A Researcher perspective is a particular stakeholder perspective that is adopted by a researcher as the, or a, viewpoint from which to observe phenomena during the conduct of a research project

Evidence shows that the majority of published IS research adopts the perspective of a single stakeholder (Clarke, 2015, 2016, 2020a; Clarke et al., 2021). Three broad categories of entity are usefully distinguished whose interests Single-perspective research projects could in principle reflect:

- **The system sponsor**

This refers to the organisation that develops, implements or adapts an information system, a process or an intervention, or causes it to be developed or implemented, or for whose benefit the initiative is undertaken. For example, a great deal of research into electronic markets adopts the perspective of a market operator; but some adopts that of a trader that operates its own information system to enable it to conduct transactions in markets.

- **A user of the system**

This refers to people who, or organisations that, are actively-involved participants in the information system, process or intervention. In electronic markets research, this is

commonly traders and brokers making use of a market operator's information systems.

- **A usee of the system**

This refers to people or organisations that are not actively involved in the information system, process or intervention, but are materially affected by it. The term ‘usee’ is not yet widely adopted, but it has been in currency for over a quarter-century (Clarke, 1992; Fischer-Huebner & Lindskog, 2001; Baumer, 2015). In the context of electronic markets in personal data, for example, the individuals to whom the traded data relates are ‘usees’.

The entity whose interests are privileged by the design of any particular research project could be in principle any entity in any of the above three categories. In practice, however, on the basis of the empirical research cited above, the large majority of single-perspective research is conducted for the benefit of system sponsors.

There are alternatives to single-perspective research. A considerable proportion of research adopts as the object of study a dyad. In electronic markets, this may be the marketplace operator and traders, or some category of them. A great deal of the research in which a dyad is the object of study is single-perspective research, because it is conducted from the perspective of one of the two entities, with that entity's interests treated as objectives, and the interests of the other entity as constraints on the achievement of the first entity's aims. In **Dual-perspective research**, on the other hand, the interests of both entities in the dyad are treated as objectives, and hence the conflicts between the two entities' interests are internalised within the object of study. An example in the electronic markets literature is Hou & Blodgett (2010, p. 29):

"The results from this study have important implications for auction design [but, in addition,] sellers, in order to increase their revenues, should ..." (p.29)

Multi-perspective research is also feasible, but involves considerably greater challenges. This is because the interests of multiple entities are inevitably in more substantial conflict than that which arises when only two stakeholders are in competition. For example, personal data markets involve market operators, sellers, buyers, usees (i.e. the people whose data is being traded), and organisations seeking to represent the usees' interests. In such circumstances, conflicts among interests are likely to extend across multiple dimensions. Rather than the conflict being of the nature of a zero-sum game centred on the price of goods or services, some entities will be concerned about contract terms that assign risk, and others will focus on psycho-social concerns of the usees.

A metaphorical description of the importance of multi-perspective research is provided by Worrall (2004): “If we decide to shine the light from one direction then we might illuminate one face of our subject very clearly and only create one set of shadows but if we illuminate our subject from multiple directions we can see that our subject does not have a single face, it has multiple faces and we also create a very complex pattern of shadows” (p.163). Elsewhere in the management literature, Ho et al. (2015) argue that “The active involvement of concerned stakeholders [including national/local government, policy makers, environmental groups, community/public] would lead to a balanced consideration of multiple and conflicting voices of customers ...” (p.152).

Multi-perspective research also has important applications inside organisations. In evaluating strategic supplier performance, Dey et al. (2015) consider various internal stakeholder groups: “finance, procurement, production, quality, technical, marketing departments and top management” (p.197). Strecker et al. (2011) argue that “IT risk assessment methods need to take the perspectives of stakeholders with different professional backgrounds— from IT operations to management—into account” (p.597).

Where the challenges inherent in multi-perspective approaches can be overcome, electronic markets research can deliver substantial value. One setting is tightly-linked supply chains, or segments of them, as proposed in Reimers et al. (2004), or infrastructures to support them (Klein et al., 2012). Another setting is inter-organisational networks, as have long existed in international trade (e.g. Wrigley et al., 1994; Cameron & Clarke, 1996; Baida et al., 2007). Networks are evident in many contemporary industry sectors, including Internets of Things (Gershenfeld et al., 2004), smart cities (Zanella et al., 2014), and the digital surveillance economy (Zuboff, 2015; Clarke, 2019a). Further, where researchers seek to contribute to the resolution of public policy questions, the adoption of this approach is essential. Key aspects of researcher perspectives are summarised in Table 1.

Table 1 Researcher perspective categories

Category	Examples
Single-perspective	Marketspace Operator (MSO) Trader Service-Provider Usee Regulator
Dual-perspective	MSO and Trader Trader and Employee Trader and Usee Regulator and MSO Regulator and Trader
Multi-perspective	Multiple of MSO, Trader, Employee, Usee, Regulator

As indicated by the above discussion about conflicts among interests, stakeholders’ perspectives do not necessarily lie on the same dimension. Where B2B participants are negotiating on the price of a tradable item and the allocation of the costs of delivery, the perspectives of both parties lie on the economic dimension. On the other hand, an organisation’s interests in relation to its staff may focus on the cost and productivity of labour, whereas employees are concerned about not only economic factors (in particular, pay and allowances) but also factors on the social dimension (such as impositions on their free time, work-induced stress, compulsory unpaid overtime, monitoring of work performance, and physical intrusions such as the enforced extraction of biometrics for identity authentication and body fluids for drug-testing).

The existence of multiple dimensions is reflected in the ‘triple-bottom-line’ reporting movement (Elkington, 1994), and in the notion of corporate social responsibility (CSR) (Hedman & Henningsson, 2016). Meanwhile, the accelerating pace of partly-anthropomorphic climate change needs to stimulate activity in many disciplines. Recognition of the importance of the environmental dimension exists within IS (Watson et al., 2010; Elliot, 2011; Malhotra et al., 2013; Gholami et al., 2016), and in Electronic Markets (Kranz et al., 2015); but few researchers have responded to the calls. For example, the focus of the ‘Green IS’ field is almost entirely on organisational cost-savings and image-burnishing, not on energy-savings, resource-savings or emissions reductions. Research in electronic markets needs to take into account not only the economic, but also the social and environmental dimensions. Key examples of values on each of the three dimensions are presented in Table 2.

The framework as a whole

Together, the Layers of Regulatory Mechanisms in Fig. 1, the Players and Plays in regulatory schemes in Fig. 2, the Researcher perspective categories in Table 1, and the Dimension categories in Table 2, provide a framework that

Table 2 Dimension categories

Category	Indicators
Economic	Revenue Market Share Market Power Consumer Rights
Social	Work-Induced Stress Discrimination Data Privacy
Environmental	Carbon Trading Emissions Management Energy Conservation Resource Recycling

can be applied to the assessment of existing research into electronic markets, and to the discovery of further opportunities for research. An important attribute of the framework is that it encompasses the full gamut of elements that may arise, and presents them in a structured manner. Researchers considering the regulatory regime that currently applies within a particular context, or possible adaptations to an existing regime, or a possible new regime, can use the segments of the framework as checklists to ensure that potentially relevant aspects are not overlooked.

The following section considers electronic markets research with emphasis on contributions within the IS discipline, and re-visits the question asked by the journal’s Editors about the extent to which regulation topics have featured in, are currently featuring in, and should feature in, published research on electronic markets.

Regulation in electronic markets research

This section delves into the question of what aspects of the regulatory framework have and have not been addressed by electronic markets research. As expressed in the introductory comments, the focus is on the IS discipline, but with reference to some salient publications in other disciplines. It is natural to commence with an examination of the corpus of the specialist journal, *Electronic Markets*. This is supplemented by similar but shallower checks in the other most directly-relevant research-domain journal, the *International Journal of Electronic Commerce*, and in two basket of 8 journals.

As is to be expected with a journal of 30 years’ standing, which bridges the print-only and electronic-only publishing eras, the articles in the journal *Electronic Markets*(EM) are stored in varying formats – some image-only and some text-accessible; and are discoverable and viewable through various channels, some searchable and others not. The pragmatic approach was adopted of searching on the ProQuest site. This provided access to full-text from 2009 (Vol. 19, Issue 1) to 2020 (Vol. 30, Issue 2), and Abstract access from 2004 (Vol. 14, no. 3).

The ProQuest search service is known to have quality issues. In this case, the number of articles found in searches was somewhat unstable, and the date-ranges nominated in searches were not reliably handled. The service did, however, enable the creation and prioritisation of a list of relevant articles with a fairly high degree of confidence. The count of full-text articles 2009–20 appeared to be 383, plus 145 abstract-only during 2004–08, a total of 528. The string <regulat* > was selected, in order to encompass the variants regulation, regulatory, regulator, and less commonly regulatee and regulative. Of the 383 articles in the period 2009–20, this yielded variously 147 and 154 of the 383 in full-text (38–40%). However, it was clear from inspection that a large proportion of these merely used the term casually or in ways not relevant to the topic in focus here.

The approach adopted to selecting articles for review was to commence with those that had <regulat* > within abstract or title. Across the full corpus 2009–20, 25 articles (6.5%) had the term in the abstract. The term appeared in Title in 2 cases (plus 1 Erratum), but these were already included in the list of 25. A scan was then conducted of the higher-ranking among the other more than 100 articles in the 2009–20 period that contained the string, identifying 23 additional works of potential relevance to the study. Searches were then conducted using the term <governance>, and 15 occurrences in abstract were reviewed. In most, regulatory issues are not central, or the authors’ concern is only with internal organisational control, which is peripheral to the present focus. This added 2 more articles to the set. This brought the pool to 50 in all.

Copies of these 50 articles were acquired, in many cases via Proquest, but in some cases from Springer or other repositories. On examination, it was found that 9 of the 50 were not sufficiently relevant to the purposes of the study. That left a pool of 41 relevant works of the total published, which was variously 528 or 534 (8%). The 41 articles were published across 17 years, for an average of 2.4 p.a. Table 3 evidences an acceleration in interest during the last decade and especially in 2019–20.

The pool of 41 articles was examined in sufficient detail to extract relevant quotations. These were sought primarily to

Table 3 Time-distribution of relevant articles in EM

Year	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
Count	3	1	1	2				2	3	2	3	4	1		4	7	8
Grouped			7				5				10				19		
Total			145				102				121				166		
per mille			48				49				83				114		

assist in applying the framework summarised in the Hierarchy of regulatory mechanisms in Fig. 1, the Players in regulatory schemes in Fig. 2, the Researcher perspective categories in Table 1, and the Dimension categories in Table 2. In addition, themes were noted that have been prominent in the accumulating literature.

In each of the following four Tables, for each of the relevant categories, terms and quotations are presented that are indicative of that category, and the frequency is shown with which relevant mentions occurred in the pool of 41 articles. As Table 4 shows, concerns about formal regulation dominated the sample.

In Table 5, an indication is provided of the players whose activities in the research domain were subjected to study. Some works took a broad, even vague, view of the phenomena under study, and some expressly included all players. Unsurprisingly, the regulatees were almost always in view, and frequently the main focus. There were some instances in which the regulator was of primary interest, but fewer in which the intended beneficiaries of the regulation took centre-stage.

As previously mentioned, articles in the IS and adjacent literatures have primarily adopted the perspective of a single stakeholder, and that stakeholder has usually been the system

Table 4 Regulatory mechanisms in electronic markets research

Layer	Examples	Occurrence
(7) Formal Regulation	Many occurrences of legislation (and, in appropriate jurisdictions, the common law) in relation to rights protection, contracts, product quality, guarantees / warranties, recourse, fraud, imposed standards, market access, reporting, market monitoring, market supervision, compliance, enforcement	Dominant
(6) Meta- and Co-Regulation	“the shapes of, and the processes in, many marketspaces are significantly affected ... by corporations and associations with statutory regulatory responsibilities (such as stock exchanges), auditors” (Clarke, 2020a p.18)	Rare
(5) Pseudo Meta- and Co-Regulation	Marketspace ‘supervisors’ with coordinative functions but no authority or powers	Rare
(4) Industry Sector Self-Regulation	Third-party certification, escrows, industry standards, collaborative / shared infrastructure (Wallbach et al. 2019), unenforceable ethical guidelines	Occasional
(3) Organisational Self-Regulation	Customer charters, corporate social responsibility	Rare
(2) Infrastructural Regulation	<p>“financial market infrastructures” (FMI), comprising “the stock exchange, the clearing and settlement provider (clearing organization) and the gross settlement payment system (payment organization)” (Alt & Puschmann 2012, p.205)</p> <p>“eXtensible Business Reporting Language (XBRL) is a standard XML reporting language [for] quality assurance and policy enforcement” (Liu et al. 2014, p.47)</p> <p>“the standards [for smart energy information systems (SEIS)] need to be developed to overcome technical, political, and regulatory barriers” (Schwister & Fiedler 2015, p.37)</p> <p>“Control mechanisms for sustainable quality of life” (Oesterle 2020, p.51)</p>	Occasional
(1) Natural Regulation	Adjustments to regulatory arrangements to reinforce economic factors, in particular through financial incentives and disincentives, and reputational factors, such as metabrands, and ‘naming and shaming’	Occasional

Table 5 Players in electronic markets research

Category	Examples	Occurrence
Regulatee	Marketspace operators (using many, sector-specific terms), hubs, providers of collaborative infrastructure, platform providers, buyers / consumers / customers, sellers / vendors, traders, market-makers, brokers, manufacturers, agricultural producers	Dominant
Regulator	“Regulators should implement XBRL adoption ... to ensure quality and reliability of information reported” (Liu et al. 2014, p.53) “regulators can take advantage of greatly improved auditability of data [through] an interoperable context-aware metadata-based architecture” (Maguire et al. 2015, pp.156, 155)	Occasional
Beneficiary	“[Customers] believe that the law should protect them from the misuse of personal health data and regulate the way in which insurance companies collect, use, and protect private information” (Wiegard & Breitner 2019, p.116)	Occasional

sponsor. As shown in Table 6, researcher perspectives adopted in electronic markets research evidence a similar pattern, although there are instances in the sample that adopt the perspective of a regulator, and of beneficiaries. There are also several works that reflect the perspectives of both players in a dyad, and some evidence of the benefits of recognising the interests of multiple stakeholders.

As shown by Table 7, the focus of almost all of the works was on economic factors, in some cases with an emphasis on regulation as a constraint, and in others as a positive factor in economic activity. Several instances existed of focus on, or at

least recognition of, social factors, and one instance existed of a concern with environmental objectives.

Cross-checking was conducted against the collected works of three other journals. The first was the primary journal in the eCommerce domain. A search in Ebsco on the complete works of the International Journal of Electronic Commerce (IJEC) 2000–2019 found 9–15 occurrences of <regulat* > in abstract in 499 articles (2–3%). (Like most other repository services, Ebsco evidences reliability and stability issues). This gave rise to 3 articles (<1% of the corpus) that provide insights into attitudes to regulation in the electronic markets literature.

Table 6 Researcher perspectives in electronic markets research

Category	Examples	Occurrence
Single:		
• Regulatees	Marketspace operators, but also sellers, buyers, traders	Dominant
• Regulators	" ... research can adopt the perspective of a regulator, such as a government agency responsible for industry supervision, an auditor, or a marketspace operator whose functions include monitoring of the behaviour of market participants" (Clarke 2020a, p.19)	Occasional
• Beneficiaries	"[Customers] believe that the law should protect them from the misuse of personal health data and regulate the way in which insurance companies collect, use, and protect private information" (Wiegard & Breitner 2019, p.116) "we will need new types of regulatory approaches as societies globally are trying to come to terms with this phenomenon [of giant platforms incl. Amazon, Google, Facebook, Apple]" (Goeldi 2020, p.56)	Occasional
Dual	"[Companies that collect personal data] should give customers the option to pay for online services that are fully privacy preserving and only allow for data sharing with third parties if customers allow this to happen and get a fair share of the deal ..." (Spiekermann et al. 2015, p.165) "Dual-perspective Research can be usefully conducted on many stakeholder-pairs. Important examples include marketspace-operator and trader; buyer and seller; trader and financier; and marketspace operator and regulator" (Clarke 2020a, p.19) "users' benefits from [reputation] portability between platforms ... – to avoid lock-in effects ..., overcome the inherent “cold-start” problem when first using a platform ..., or to realize price premiums (as providers) and increase chances of being able to book services (as consumers) ... Consequently, platforms could indirectly benefit from imported trustworthiness, increased sales numbers, and higher prices and, in turn, fuel their own business model" (Hesse & Teubner 2020, p. 335-6)	Occasional
Multiple	"an interoperable context-aware metadata-based architecture ... can help satisfy the interests of regulators, users, and industry" (Maguire et al. 2015, pp.155, 160)	Rare

Table 7 Dimensions in electronic markets research

Category	Examples	Occurrence
Economic	Negative: Many occurrences of costs, fines, burdens, impositions, inhibitors, hindrances, penalties rather than incentives, uncertainties Positive: Many occurrences of incentives, imposition of collaboration and mutually-compatible infrastructure and standards, trust, institutionalised transaction environment, competition assurance	Dominant
Social	“the mere existence of personal data markets may affect society ... [e.g. privacy.] social cohesion, equality of opportunity, freedom, and democracy” (Spiekermann et al. 2015, p.163) “[Customers] believe that the law should protect them from the misuse of personal health data and regulate the way in which insurance companies collect, use, and protect private information” (Wiegard & Breitner 2019, p.116) “users’ benefits from [reputation] portability between platforms ... – to avoid lock-in effects ..., overcome the inherent “cold-start” problem when first using a platform ...” (Hesse & Teubner, 2020. p.335)	Occasional
Environmental	“[Energy] market players need to be given adequate incentives to optimize ... environmental sustainability” (Kranz et al., 2015, p.14)	Rare

These addressed ‘regulatory concern’ as an inhibitor of adoption of E-Business (Hsu et al., 2006), e-contracts as a means of ensuring product quality in agricultural supply chains (Bacarin et al., 2008), and regulatory impositions on high-frequency exchange trading (Manahov & Zhang, 2019).

Two of the Basket of 8 journals were selected as a further basis for cross-checking. Superficially, it appeared that the Journal of Management Information Systems (JMIS) might have a strong orientation towards the interests of IT user organisations; whereas the Information Systems Journal (ISJ) might be both broader in its scope and more welcoming to research from the perspectives of less powerful parties.

In ISJ, 11 articles were found in a corpus of 658 articles. However, only 2 were relevant to the study (< 0.5%). These considered the impact of crowdsourcing on employment and contracting, and stimulation of e-commerce eco-systems in rural China. With qualifications, the content of the additional articles from sources outside EM was broadly consistent with the results presented in Tables 4, 5, 6, and 7.

In JMIS, Ebsco found 36 occurrences of <regulat* > in abstract in 1499 articles. Of these, 18 were relevant to the topic under consideration (1%). Most of these had the interests of regulatees in view. However, half included the perspective of regulators, or, in a few cases beneficiaries of regulation. Topic-areas included means of achieving benefit-sharing in cloud computing, reduction in investor-herding, stock markets, Google, Bitcoin, health insurance, and minors’ online privacy. Significantly, Gomber et al. (2018) remarked that “Academic researchers should play a central role in assisting regulators and policy-makers in evidence based policymaking (EBPM) before regulations are drafted” (p.251).

Among the works in these samples, several themes were also evident that were not encapsulated in the framework defined earlier in this article. Several articles considered the impacts of regulation on business models (e.g. the Timmers interview in Alt & Zimmermann 2014). Another discernible theme was regulation-driven design, e.g. to aid app service providers in designing EU GDPR-compliant privacy-transparent apps (Betzing 2019).

At a broader level, regulatory measures may be expressly used to shape an industry sector, e.g. regulation from the Finnish government designed to lead to changes in the platform and the ecosystem surrounding it, adding a layer of service brokers into the eID scheme, in order to regulate the market and increase competition (Bazarhanova et al. 2019). This echoes earlier studies of the Singapore Hog Auction Market (Neo & Clarke, 1992; Neo, 1992) at level (7) Formal Regulation, and Clarke and Jenkins (1993) re the Computer-Aided Livestock Marketing scheme (CALM), which is at level (4) Industry Self-Regulation.

Regulation has been considered in specific technological contexts, such as blockchain (Alt & Wende 2020), and high-frequency exchange trading (Manahov & Zhang, 2019). The concerns expressed in EM Editorials about a paucity of attention to regulation in electronic markets contexts is borne out by this updated survey. It is evident, however, that, over time, more researchers are being attracted into the area.

The following section addresses the need for evaluation of the research framework presented in this article. Collaborative infrastructure has been the focal-point of a number of contributions in recent years, such as the review in Wallbach et al. (2019) of “the largest air cargo hub in Europe at the airport in

Frankfurt, Germany” (p.684), connecting multiple “actor groups (i.e. forwarder, trucker, handling agents, and airlines)” (p.699). A particular form of multi-organisational business model and architecture has recently attracted the attention of researchers in the electronic markets domain. A range of ‘platforms’, including Amazon, Google, Facebook and Apple (Goeldi, 2020), have achieved substantial monopoly power, even to the point of being able to resist demands for compatibility and portability (Hesse & Teubner, 2020). One particular ‘mobility service platform’, Uber, has spawned many variants (Hein et al., 2019), and accordingly represents a suitable choice of a domain for closer attention in the following section.

The framework applied to platforms

Digital platforms have been attracting considerable attention. They take varying forms in various industry sectors, and hence represent a rich basis for testing the framework’s suitability for its intended purpose. This section applies the framework to platform-based entrants that are disrupting existing industry sectors. There is tension between a perhaps now dated theory of disruption, associated with Christensen (1997), and an alternative form argued by Muller (2020) to fit far better with the technology-platform phenomenon. This article adopts the Muller interpretation that “A new technology is disruptive ... if it ... supplants the incumbent technology, and significantly changes the behavior of most of the stakeholders in this industry” (p.47). On that basis, successful platforms are generally disruptive technology. This section commences by considering platforms in the abstract, then examines the regulatory aspects of the operations of Uber.

The platform-based business sector

A regulatory agency recently offered a simplified description of digital platforms as “applications that serve multiple groups of users at once, providing value to each group based on the presence of other users” (ACCC, 2019, p.41). In Tauscher and Laudien (2018), four defining features of a platform-based digital marketplace are proposed (p.320):

- digital marketplaces connect independent actors from the demand and supply sides via a digital platform;
- these actors enter direct interactions with each other to initiate and fulfil commercial transactions;
- the marketplace platform provides an institutional and regulatory frame for transactions; and.
- the platform does not substantially produce or trade goods or services itself.

Exemplars of such platforms that have attracted particular attention in recent years include eBay (since 1995), [booking.com](#) (1996), Expedia (1996), Tripadvisor (2000), Mechanical Turk (2005), YouTube (2005), Airbnb (2008), [Freelancer.com](#) (2009), Pinterest (2009) and Uber (2009). Claims are made by and for such platforms that they provide information infrastructure to enable more efficient matching of supplier capabilities with customer needs and more efficient use of assets and labour to deliver services. Some years elapsed before the topic attracted much attention in Electronic Markets, with only 4 articles up to 2017 (in 2008, 2012, 2016, and 2017). However, after 4 articles in 2018, a Special Issue on the topic in 29, 4 (December 2019) was followed by 3 more in the following year, importantly Hein et al. (2020).

A great deal of the discussion about platform-based corporations is concerned with business strategy, business models, and the application and exploitation of Internet, Web and mobile technologies to achieve the aims of that corporation, subject to the constraints of adequately reflecting the interests of the actors on the demand and supply sides. The focus here, however, is primarily on the regulation of the behaviour of platform-based corporations in order to protect the interests of other parties. Those parties include not only platform users, but also other entities that are affected by the platform’s operations (‘usees’), industry sectors and segments as represented by industry and consumer associations, government policy agencies, and organisations that perform regulatory functions in relation to the relevant marketplace.

The emergence and proliferation of the platform model has excited a great deal of enthusiasm in both the formal and informal business media (e.g. Kavadias et al., 2016; Smith, 2016; Uenlue, 2017a; Kumara et al., 2018; Teece, 2018). Common themes are inefficiencies arising from longstanding regulatory arrangements, and the benefits of de-regulation (Cannon & Summers, 2014; Geradin, 2015; Wallsten, 2015; Kaplan & Nadler, 2015). A sub-set of the conversation is concerned with the adaptation of regulatory schemes. In some jurisdictions, regulatory schemes have collapsed, negative impacts of unregulated markets have been felt, and a “need for new regulations to mitigate the market power of platforms” has arisen (Hein et al., 2019, p.642). This includes some quite new areas, e.g. “enabling (or even enforcing) reputation portability has emerged as an interesting option for regulation” (Hesse & Teubner, 2020, p.336). This is resulting in a focus on re-regulation (Ballon & Van Heesvelde, 2011; Rauch & Schleicher, 2015; Wyman, 2017; Heikkilä & Heikkilä, 2019).

New platforms typically launch by harnessing new entrants, e.g. consumers with used assets to sell (e.g. eBay), home-owners with spare space that in the past has not been systematically let out for use by other people (Airbnb), and car-owners who have not previously offered fee-for-service car-rides (Uber). Many such schemes have taken advantage of loopholes in existing regulatory schemes to under-cut the

prices in existing, regulated markets and thereby gain a meaningful market-share. This can achieve the ratchetting down of the regulatory regime, and may also enable the recruitment of existing suppliers into the scheme. In time, a re-concentration of market power may occur, accruing to the platform-based company, and this may in turn enable price-increases. Stock market valuations suggest a belief among investors that operations that initially make very large losses are likely to later achieve super-profits from the monopoly power that they develop.

In EM's 30th anniversary Issue, the Editorial noted the problem of bias arising in multi-sided platforms where the platform-operator is also a seller (Alt, 2020, p.2). One article in that Issue referred to the dangers of "giant [near-monopolistic] platforms ... suddenly changing business rules, discontinuing essential functionality or going into a market segment previously served by some of their most loyal partners" (Göldi 2020 p.55–56), and another noted the market power of "[oligopolistic and] parasitic ... intermediaries for market services, as Google or Amazon ... feeding on the market participants' personal data" (Schmid 2020, p.53–54).

Alternatively, a parliament or a regulator may assert its authority. An empowered and activist regulator might force the disruptor to comply with the law, it might preclude the corporation from operating in a particular jurisdiction unless it establishes a local subsidiary that adopts a customised business model, perhaps materially different from the corporation's mainstream, and it might even prevent the disruptor from operating. A widely-publicised example is Uber's ejection from the London market by the regulator, Transport for London, because of "a 'pattern of failures' ... that placed passenger safety at risk" (BBC, 2019).

Some regulators have moved decisively. However, responses by others have been very slow, and the measures adopted piecemeal. An Australian regulatory policy agency has recently examined digital content platforms, in particular Google Search, Facebook, YouTube and Instagram, with a focus on their impacts on news reporting and journalism (ACCC, 2019). It found that the fundamentally different approach taken by digital content platforms is enabling them to avoid a range of existing regulatory measures, and that this has created serious threats to transparency, to competitive markets in digital content and in advertising, to the economic viability of news reporting, and to consumers' interests. Its Report recommended many adaptations to the regulatory regime for digital content. The ACCC has since developed a proposal for regulation of the use by Google and Facebook of content drawn from Australian media corporations (ACCC, 2020). This attracted international attention (Woollacott, 2020; Smyth, 2020), and was quickly followed by renewed interest in both the USA and the EU in content platforms' capacity to suppress content.

The Uber platform

The particular platform that has attracted most attention, by consultants and academics alike, is the Uber 'ride-sharing' platform, which has had major impacts in many economies. In addition to its own significance, Uber has stimulated a range of look-alike disruptors in ride-services markets. Many of these are additional or alternative new entrants in the market for taxi-fares, or a substitute for taxis (e.g. Lyft, Bolt, Didi, Ola). In some cases, however, they have instead displaced use of public transport, bicycle-riding and walking. Other Uber-like start-ups have been in the motor-cycle and motor-vehicle courier markets (e.g. Foodora, Sherpa, Zoom2U), and in the heavy goods vehicle arena (e.g. Flexport, Convoy, Saloodo).

On the supply side of the Uber platform, drivers are attracted by ready access to work, no need to have any knowledge of local geography, flexible hours, the ease and speed of joining up, and the limited need for business management. On the demand side, Uber's value proposition comprises easier ordering, shorter delay before pickup, cheaper trips, and no-effort payment. For a comprehensive review of Uber's business model, see Uenlue (2018).

Taxis are of long standing, and provide an important element of flexibility to complement mass public transport, but their operations are deeply embedded in a social and economic environment in which conflicts arise. As a result, they have suffered an accretion of regulatory mechanisms that has become rusted-on. The key ingredient that enabled a 'mobility service platform' to pull the rug out from beneath the established process was mobile digital services that enabled a new entrant to (a) receive requests from people who wanted a ride, (b) know the whereabouts of available private vehicles prepared to provide a ride for-fee, (c) connect the two, (d) handle the payment process remotely and automatically, and (e) rely on the driver's own handset to overcome their ignorance of geography to get efficiently from place to place. There was nothing that in principle precluded the established taxi-hub operators from applying those same technologies to upgrade services, but nothing to impel them to do it, little to attract them to do it, and a great deal of existing infrastructure, process, internal bureaucracy, and externally-imposed bureaucracy that made it very difficult to implement. A new entrant, unencumbered by legacy, could move swiftly. Uber did: "The successful expansion of Uber has been based on a deceptively simple use of modern technology, in which the initial bookings, the route to be taken, the calculation of fares, and finally payment, are all made by means of a smart phone app" (Dudley et al., 2017, p.493).

Perceptions of Uber's impact vary, because of enormous differences in contexts across the company's areas of operation (Carson, 2018). In this author's regional city, for example, taxis continue to dominate weekdays, but are challenged by Uber in the evenings and on weekends. This appears to be

in part ‘cherry-picking’ behaviour, servicing only the periods offering lower idle-time factors and higher prices (termed ‘surge’ by Uber). This has a public benefit, because its effect is to add capacity when it is most needed. Anecdotally, another key factor is that most Uber drivers in the city in question appear to use it only as a second income, and have a full-time weekday job. One study suggests that whereas large cities may have seen Uber and its imitators take as much as half of what was previously the taxi-market, the market-share achieved in smaller cities and large towns appears to be far lower, and the impact in regional and rural areas very limited (IPART, 2019).

Uber is a particularly appropriate choice as a case study on RegTech opportunities, because its culture generally is somewhat extreme, and prominent within that culture is its wilful disregard for existing regulatory regimes (Jordan, 2017). Its self-image is as a disruptor. In a remarkably large number of jurisdictions, the regional government has buckled, studiously ignoring breaches, or changing laws in order to avoid having to enforce them. In some jurisdictions, the anger of those who have lost their investments and those who have lost their livelihoods has been aimed at least as much at regulators who failed to enforce the law against Uber as against Uber itself. In many major cities, the value of existing taxi businesses has plummeted. Their cost profiles reflect the need to achieve compliance with longstanding regulatory measures; but the rules are no longer enforced or have been suddenly rescinded. In Sydney (Australia), a city of over 5 million people, taxiplates had been a secure small-business and semi-retirement investment for many decades. During the first 2 years after Uber launched, 2012–14, the average sale-price eased 5–10% down from a 4-year plateau of around AUD 400,000. A year later, at the end of 2015, they were down 50% to around AUD 200,000, were stable for 2 years to the end of 2017, and in the following 2–1/2 years spiralled down to below AUD 100,000 (PTP, 2020). In some jurisdictions, compensation has been provided to cushion the blow; but in many the impact of regulatory failure was borne by investors.

Uber has been accused of a very wide range of regulatory non-compliance (Henley, 2017; DWO, 2018). More than half of the issues arise from the nature of the business. A major category is operation without the necessary business licences and not meeting the standards to qualify for one - such as a sufficiently broad area of service, driver qualifications and local knowledge, and worker protections. In some jurisdictions, Uber has been associated with an elevated incidence of driver offences such as indecent assault. Challenges to labour laws have also been common, in particular because of the company’s denial of employee rights and entitlements by claiming that drivers are independent contractors. Uber has been one of the key players in the revival of the hitherto much-maligned ‘piecework’ mode of remuneration for labour, with substantial reductions in workers’ income camouflaged

by the enthusiastic use of terms such as ‘gig economy’ and ‘crowdsourcing’ (Kaine et al., 2017; Akhtar, 2019).

Another cluster involves breaches of tax law and of competition law (price-fixing, collusion, misleading practices). Uber has suffered vast losses. During 2016–19 alone (prior to the onset of COVID-19), total revenue of USD 37bn was achieved, but losses of almost USD 19bn (Levy, 2020). Its high market-share reflects both below-market payments to drivers and sustained loss leadership financed by investors lured by the prospect of monopoly-based super-profits. This raises the prospect of challenges on the basis of trade practices /anti-trust/ monopoly laws.

Even where acting entirely legally, Uber and other ride-sharing platforms can have material impacts that require adaptation by regulators. For example, there is evidence that Uber is exacerbating traffic congestion in many cities, leading to adjustments to congestion fee regulations in order to achieve a reduction in traffic and recover displaced use of public transport (Bond, 2019; Giordano, 2019). In Heikkilä and Heikkilä (2019), the scope is investigated for applying the commons governance principles of Ostrom (1990).

The hierarchy of regulatory mechanisms in Fig. 1 is readily applicable to the specifics of Uber. Of particular relevance are Layer (7) Formal Regulation (where longstanding regimes collapsed) and Layer (4) Industry Sector Self-Regulation (where longstanding ‘approved oligopoly’ arrangements were undermined). A particular challenge that arises from Uber’s operation in multiple countries is the diversity of approach, structure and processes among Regulators. In the most comprehensive analysis seen to date of the regulatory aspects of the Uber-driven taxi market, Wyman (2017) identified the “pillars of taxi regulation” as entry, fares, consumer safety, worker protections and universal service requirements (pp.31–74). In some analyses, the Beneficiaries are customers, while in others they are Uber’s drivers, and on occasions the jurisdiction’s revenue-collection function is in focus. A category of Consultants of particular relevance in Uber’s case is what Uelenen refers to as ‘lobbyists’, whose role is to hold off regulatory enforcement.

At Layer (3) Organisational Self-Regulation, for Uber to continue to hold regulators at bay, ongoing public goodwill is vital, and hence the company needs the media to carry feel-good stories, to not discover newsworthy bad news, and most of all to not have the opportunity to snowball bad news stories. The significance of Layer (2) Infrastructural Regulation looms large, particularly in view of the central role that IT plays in the Uber platform. The company’s operations generate a vast treasure-trove of data, not only from the high volume of transactions, but also from its embedded and extensive tracking of both drivers and customers. In order to support early problem identification, and early action to pre-empt negative reports, automated exception and incident reporting are essential, together with an incident management system that nags those

responsible for managing issues. All of these features need to be deeply embedded in the corporation's operational systems.

Data analytics supports Uber in relation to not only strategic decision-making but also its ongoing battles with regulators. In part, this battle is engaged indirectly, by addressing the media, the public, policy agencies and parliamentarians. The company's focus is less on compliance and more on demonstrating that the game has changed, that it has changed for the better, and that (preferably) selective de-regulation or (at worst) re-regulation is needed. This can be achieved through anecdotes, supported by data, that convey the image of the platform business model delivering public value.

A key issue from the viewpoints of both corporate strategy and public policy is supply-side elasticity during peak demand periods. The conservatism long evident in most jurisdictions has resulted in few more taxis being available during high-demand periods than at other times, e.g. few jurisdictions issue peak-hour-only taxi-permits. This is reinforced by the rusted-on norm of a fixed tariff. Even where two-level tariffs are applied, the higher rate is often for the lower-volume overnight shift – which is the inverse of the rationalist economic recommendation to use upward price-flexibility to stimulate supply during periods of high demand. (Even conservative government public transport services use time-of-day-dependent tariffs in order to shift some of the demand to off-peak periods). Uber's data on ride-availability during 'surge pricing' periods is capable of demonstrating the efficacy of price-flexibility in varying supply and thereby satisfying customer needs. This goes well beyond predictable morning and evening CBD demand, to include near-real-time adaptation to sporting and entertainment event peaks and even wet weather peaks (but less convincingly, due to the traffic congestion effects).

Regulators' aims can also be served. In order to investigate the competing claims that existing regulatory regimes are appropriate and that they are outdated, quality reporting processes are needed on service-quality, driver-performance and safety-incident reports, supported by apps in the same way that ride-requesting is supported - and even by the same apps. The resulting data can be funnelled through services not controlled by the platform, such that Uber has no opportunity to massage the data. Similarly, direct transaction-feeds to regulators can be built into such systems to enable monitoring of key factors such as resource-utilisation, load-patterns, pollution-generation, and revenue-flows to individual drivers.

There is limited discussion of such topics in the literature, although Wyman (2017) gives consideration to the contributions that could be made by RegTech: "Technology might be harnessed to address concerns that formally removing the existing legal limits on the number of street-hailed taxis might lead to oversupply in certain geographic areas. ... [V]ariable congestion charges might be used ..., and the app provider

might be charged with collecting the congestion charge on behalf of the governmental authority" (p.39).

Similar approaches can be applied to the many other instances of platform-based markets. However, the opportunities may not always be apparent to regulators. For example, in the Short-term holiday letting (STHL) market segment, driven by the Airbnb model (Uenlue, 2017b), a review of options for reconsidering the role of regulation was limited to formal laws and self-regulation, and completely overlooked the possibility of using information technology as a tool within the mix (NSW 2017).

The model of regulatory players in Fig. 2 proved to be readily applicable to the specifics of Uber, but insights arising from this analysis suggest refinements are needed to it. A key issue in the Uber context is that drivers are Regulatees (in relation to their competencies, their responsibility for their vehicle, and their behaviour in relation to customers), but also Beneficiaries of regulation (in relation to their working conditions and remuneration). This highlights the need for the model to depict 'Beneficiary' as a plural rather than a singular entity, so as to encompass both passengers and drivers. There is also a need to support different segments within heterogeneous populations, differentiating, for example, business customers from consumers, controlled markets such as for school transport, and urban, suburban, regional and remote locations (Heikkilä & Heikkilä, 2019). An important segment is customers in wheel-chairs, who may be impacted quite differently from ambulant ride-seekers. Similarly, on the supply side, drivers fully-dependent on ride-sharing for their livelihood have somewhat different interests from part-time, second-income drivers.

Another challenge is the need for some 'Business Partners' to be factored into analyses. Of particular importance are technology providers that deliver custom-built or customised tools for collecting and managing data, matching demand and supply, providing convenience and ease-of-use, and satisfying customers' and drivers' hedonic needs. Motor vehicle providers may also become significant, to the extent that they deliver, or trial, Uber-favouring features such as embedded vehicle-tracking, automated navigation, and driverless operation. Uber's partners may of course intersect with the 'RegTech Providers' that are already included in the model – resulting variously in cross-leveraging and compromise.

In Table 1, categories of researcher perspective were distinguished. These are clearly applicable to research into the Uber platform, in that the platform operator, drivers, customers, several kinds of service-providers and multiple regulators are involved. There are several ways in which dual-perspective research would provide important insights, particularly through the dyads platform-operator and drivers, platform-operator and customers, platform-operator and regulators, regulators and drivers, and regulators and customers. Contexts within which Uber operates are sufficiently diverse

and complex that some aspects of market, system and regulatory design could only be properly understood if multi-perspective research is undertaken. A further consideration arising from the study is that the research published to date, which has been mostly undertaken by legal academics and economists, would benefit if it were complemented by analyses by specialists in information systems and system dynamics.

The categories of dimensions in Table 2 are well-represented in the case of Uber: the economic dimension by costs, revenues, market-share and income distribution; the social dimension by the pressures of piecework and the level of control over drivers' social behaviour and of exposure of the behaviour of frequent customers; and the environmental dimension by the substitution of additional emission-generating private transport for public transport, cycling and walking, and by traffic congestion issues.

The conclusion from this application of the framework to the Uber platform is that, particularly if subjected to some modest adaptations, the framework provides a strong basis for describing and analysing the regulatory concepts and processes underlying platform-based business sectors. This case study has provided evidence in support of the contentions that regulation embodies many opportunities for IS practitioners and researchers, and that the framework outlined in this paper enables their discovery and supports their articulation.

Discussion

The purpose of this article has been to demonstrate that a wide range of research opportunities exists in regulatory aspects of electronic markets. Consideration of exemplars in a targeted sample of venues suggested that relatively few of those opportunities have been grasped. A research framework has been proposed to support the assessment of specific industry sectors and segments. The comprehensive and structured nature of the framework is intended to make it much easier for researchers to ensure that important factors are not overlooked. The framework's efficacy as a tool to support research was evaluated by applying it to a particular electronic market architecture, technology platforms.

Given the nature of the study, the generalisability of the findings is subject to limitations. The scan of IS theory was intentionally targeted rather than comprehensive, and limited recourse was had to the wider literature on regulation in such disciplines as law and political economy. Individual research projects relating to regulation in particular industry sectors will need to take into account sources in specialist literatures relating to the operations of those sectors, and the framework as a whole may be improved through reference to generic studies of regulation in diverse academic and professional literatures.

The search strategy used to identify existing studies in the electronic markets field was heavily dependent on a family of terms and a single publishing venue. A systematic literature review across the full gamut of journals, conference proceedings, books and book chapters would find additional prior works and these could embody challenges to the research framework and lead to variations in the analysis, arguments and inferences put forward in this article. Further, the findings of this study of the hitherto only lightly researched area of external regulation of organisations could be blended with the results of a review of internal controls within organisations. This would be likely to reveal associations and synergies between the two arenas.

Further, no great attention was paid to contingent aspects of prior publications, such as the temporal, cultural and jurisdictional contexts in which studies were undertaken, and any industry sector or segment focus that they had. Apart from earlier pilot tests in specific contexts, the usefulness of the research framework has been evaluated only in the context of one particular platform within one category of architecture.

The validation performed by means of application to one multi-sided platform is of course a slim basis on which to assert the efficacy of the framework, even in relation to multi-sided platforms generally. Platforms evidence a variety of forms, with Alt (2020, Fig. 1, p.6) differentiating centralised / multi-sided platforms from decentralised electronic markets, and from digital ecosystems that feature standards and interoperability arrangements. Application of the framework by diverse individuals and teams, and in various contexts, is likely to lead to refinements to the categories in the various segments. Once the framework has been adjusted for early experiences, there may be benefit in presenting a summary 'canvas' of the kind popularised by Osterwalder and Pigneur (2010).

Although this article is largely addressed to researchers, the framework has implications for practice, because professionals, managers and executives in both operational organisations and regulatory agencies can use it to gain insights into their own sectors, segments and markets. This could include the assessment of spaces, mechanisms, players and plays in electronic markets with characteristics similar to those in their own context, which may lead to the identification of strategic opportunities.

The multiple segments of the framework and the categorisations they embody provide means for researchers to build consideration of regulatory matters into their analyses, and to view problem-domains from perspectives that are not often adopted in electronic markets research. This is particularly timely for researchers considering whether and how to address the emergent field of RegTech, whether in financial services or in the many other primary, secondary and tertiary sectors in which legal obligations and independent monitoring play significant roles.

The framework also offers ways to assess the many facets of regulatory impact, as a constraint on and cost-element of business operations, as an enabler of trust, as a counterweight against anti-competitive behaviour by organisations that dominate sectors or resources, as a shaper of marketplaces, as a source of competitive advantage, and even as a stimulator of innovation.

The final segment of the framework draws attention to the stakeholders in the phenomena and interventions that researchers subject to study. The researcher perspective notion poses the question to academics as to whether it is appropriate in each particular project to focus on the interests of just one of the stakeholders, and, if so, whether the system sponsor, and in the case of electronic markets, the marketplace operator, should be the sole beneficiary of the research effort. The stakeholder segment also brings to the fore the existence of dimensions other than the economic, and the importance of researchers reflecting social and environmental needs even when undertaking studies of a predominantly economic nature, and considering whether social and environmental aspects might deserve express attention in a somewhat larger proportion of the research undertaken in the field of electronic markets.

Conclusions

This study re-affirms points made by the Editors of Electronic Markets in 2011, 2018 and 2020, regarding the significance of regulation, the limited investment in IS-discipline research on regulation, and the opportunities that have yet to be taken up.

The article has articulated those opportunities by proposing and applying a framework. Mainstream single-perspective research that prioritises the interests of regulatees can examine the impacts of alternative regulatory mechanisms in any and all of the seven layers. That can generate strategic plays, and anticipate strategic plays by competitors. Changes in regulatory regimes can be identified that advantage or disadvantage regulatees, and that may need to be lobbied for and against, or for which contingency plans may need to be prepared.

Beyond that mainstream approach, single-perspective research can focus on the interests of regulators. It can also prioritise alternative stakeholders, such as market participants that are not themselves system sponsors, including buyers, sellers, traders, brokers, service-providers, financiers and insurers. Or it can choose to reflect the needs of non-participant uses, such as producers of commodities that are the plaything of market traders, and the individuals whose data is exchanged in personal data markets.

One of the conclusions from researcher perspective theory is that deeper insights into the behaviour of electronic markets can be delivered by dual-perspective research that embodies the tensions between different stakeholders, rather than

treating one as having objectives and the other as acting as a constraint on the achievement of those objectives. Further, challenging though broader, multi-perspective research may be, it is directly relevant to the analysis of supply-chains and industry networks, and to the 'win-win-win' approach to collaborative information systems. In addition, effective research in support of the work of regulators is of necessity multi-perspective in nature, because broad economic, social and environmental objectives cannot be achieved by arbitrarily carving off small portions of a complex reality and optimising an objective function that is by definition too narrow.

The recent increase in article-counts show that the encouragement to give greater consideration to regulation is beginning to bear fruit. This article offers a framework whereby the quantity, quality and impact of such research can be accelerated.

Annex

- Summaries of Relevant Articles, available at <http://rogerclarke.com/EC/RAEM-Arts.pdf>

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