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The information infrastructures of 1985 and 2018: The sociotechnical context of computer law & security

Roger Clarke^{a,b,c,*}, Marcus Wigan^d

^a Xamax Consultancy Pty Ltd, Canberra, Australia

^b University of NSW Law, Sydney, Australia

^c Research School of Computer Science, Australian National University, Canberra, Australia

^d Principal of Oxford Systematics, Melbourne, Victoria, Australia

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ABSTRACT

This article identifies key features of the sociotechnical contexts of computer law and security at the times of this journal's establishment in 1985, and of its 200th Issue in 2018. The infrastructural elements of devices, communications, data and actuator technologies are considered first. Social actors as individuals, and in groups, communities, societies and polities, together with organisations and economies, are then interleaved with those technical elements. This provides a basis for appreciation of the very different challenges that confront us now in comparison with the early years of post-industrialism.

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1. Introduction

The field addressed by Computer Law & Security Review (CLSR) during its first 34 volumes, 1985–2018, has developed within an evolving sociotechnical context. A multi-linear trace of that context over a 35-year period would, however, be far too large a topic to address in a journal article. This article instead compares and contrasts the circumstances that applied at the beginning and at the end of the period, without any systematic attempt either to track the evolution from prior to current state or to identify each of the disruptive shifts that have occurred. This sacrifices developmental insights, but it enables key aspects of contemporary challenges to be identified in a concise manner.

The article commences by identifying what the authors mean by 'sociotechnical context'. The two main sections then address the circumstances of 1985 and 2018. In each case, consideration is first given to the information infrastructure whose features and affordances are central to the field of view, and then to the activities of the people and organisations that use and are used by information technologies. Implications of the present context are drawn, for CLSR, its contributors and its readers, but more critically for society.

The text can of course be read in linear fashion. Alternatively, readers interested specifically in assessment of contemporary IT can skip the review of the state in 1985 and go directly to the section dealing with 2018. It is also feasible to read about the implications in Section 5 first, and then return to earlier sections in order to identify the elements of the sociotechnical context that have led the authors to those inferences.

* Corresponding author at: Xamax Consultancy Pty Ltd, 78 Sidaway St, Chapman ACT 2611 Canberra, Australia.
E-mail address: Roger.Clarke@xamax.com.au (R. Clarke).

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The focus of this article is not on specific issues or incremental changes, because these are identified and addressed on a continuing basis by CLSR's authors. The concern here is with common factors and particularly with discontinuities – the sweeping changes that are very easily overlooked, and that only emerge when time is taken to step back and consider the broader picture. The emphasis is primarily on social impacts and public policy issues, because the interests of business and government organisations are already strongly represented in this journal and elsewhere.

2. The sociotechnical context

The term 'socio-technical system' was coined by Trist and Emery at the Tavistock Institute in the 1950s, to describe systems that involve complex interactions firstly among people and technology, and secondly between society's complex infrastructures and human behaviour (Emery, 1959). The notion's applicability extends from primary work systems and whole-organisation systems to macro-social systems at the levels of communities, sectors and societies (Trist, 1981). Studies that reflect the sociotechnical perspective take into account the tension and interplay between the objectives of organisations on the one hand, and humanistic values on the other (Land, 2000).

The review presented in this article is framed within a sociotechnical setting. The necessarily linear representation of a complex system may create the appearance of prioritising some factors and accentuating some influences in preference to others, and even of creating the appearance of causal relationships. Except where expressly stated, however, that is not the intention.

Technological factors are considered first. Information infrastructure is discussed in sub-sections addressing each of the following four segments:

1. Devices, including both hardware and the software running in processors embedded in them.
2. Communication technologies, both locally and over distance.
3. Data, variously as raw material, work-in-process and manufactured product.
4. Means whereby action is taken in the real world. Rather than 'robotics', which carries many overtones, the expression 'actuator technologies' is preferred.

The focus then turns to what are referred to here as 'psycho-socio-economic factors'. For the 1985 context, the discussion commences at the level of the individual human, then moves via small groups to communities and societies, and finally shifts to economies and politics. The circumstances of 2018, on the other hand, are more usefully discussed by considering those segments in a different sequence. In order to keep the reference list manageable, citations have been provided primarily in relation to the more obscure and the possibly contentious propositions.

3. 1985

CLSR was established before the end of the Cold War, as the world's population approached 5 billion. (By 2018, it had leapt by 50%). Ronald Reagan began his second term as US President, Mikhail Gorbachev became the leader of the Soviet Union, Maggie Thatcher was half-way through her Premiership of the UK, Helmut Kohl was early in his 16-year term as Chancellor of Germany, and Nelson Mandela's release was still 5 years away. The European Union did not yet exist, and its predecessor, the European Economic Community, comprised only 11 of the 28 EU members of 2018. Of more direct relevance to the topic of the article, Nintendo was released, the TCP/IP-based Internet was two years old, and adoption of the Domain Name System had only just commenced.

In 1985, academic books existed in the area of 'computers and law', notably Bing and Selmer (1980) and Tapper (1982), and a range of articles had appeared in law journals. Although the first specialist journal commenced in 1969 (Rutgers Computer and Technology Law Journal), very few existed at the time of CLSR's launch, and indeed 'computers and law' special issues in established journals were still uncommon.

3.1. Information infrastructure in 1985

An indication of the technology of the time is provided by an early-1985 special issue in the Western New England Law Review (7, 3), which included articles on legal protections for software, software contracts, computer performance claims, the law relating to bulletin board activities, computer crime, financial and tax accounting for software, and privacy. The editorial referred also to the regulation of telecommunications and of the electromagnetic spectrum, regulation of banking records and of automated teller machines (ATMs), regulation of computer-related staff activities, the assessment of value of computer-readable data, software licensing cf. software sale, and taxation of services rather than goods.

The broader concepts of informatics, information technology (IT) and information infrastructure had yet to displace computing as the technical focus. Communications of the ACM in 1984–86 (Vols. 27–29) identified the topics of computer abuse, computer crime, privacy, the legal protection of computer software, software 'piracy', computer matching, trustworthiness of software, cryptography, data quality and due process, hacking and access control. IEEE Computer (Vols. 17–19) contained very little of relevance, but did add insurance against computer disasters, and offered this timeless encapsulation of technological optimism: "The technology for implementing semi-intelligent sub-systems will be in place by the end of this century" (Lundstrom & Larsen, 1985). Computers & Security (still very early in its life, at Vols. 3–5) added security of personal workstations, of floppy diskettes and of small business computers, data protection, information integrity, industrial espionage, password methods, EDP (electronic data processing) auditing, emanation eavesdropping, and societal vulnerability to computer system failures.

The intended early focus of CLSR can be inferred from a few quotations from Volume 1. "Hacking' ... has now spread ... on an increasing and worrying scale ... many of the computers on

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