



DYNAMICS OF VIRTUAL WORK

Labour in Contemporary Capitalism

What Next?

Ursula Huws



Dynamics of
Virtual Work

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Technological change has transformed where people work, when and how. Digitisation of information has altered labour processes out of all recognition whilst telecommunications have enabled jobs to be relocated globally. ICTs have also enabled the creation of entirely new types of 'digital' or 'virtual' labour, both paid and unpaid, shifting the borderline between 'play' and 'work' and creating new types of unpaid labour connected with the consumption and co-creation of goods and services. This affects private life as well as transforming the nature of work and people experience the impacts differently depending on their gender, their age, where they live and what work they do. Aspects of these changes have been studied separately by many different academic experts however up till now a cohesive overarching analytical framework has been lacking. Drawing on a major, high-profile COST Action (European Cooperation in Science and Technology) Dynamics of Virtual Work, this series will bring together leading international experts from a wide range of disciplines including political economy, labour sociology, economic geography, communications studies, technology, gender studies, social psychology, organisation studies, industrial relations and development studies to explore the transformation of work and labour in the Internet Age. The series will allow researchers to speak across disciplinary boundaries, national borders, theoretical and political vocabularies, and different languages to understand and make sense of contemporary transformations in work and social life more broadly. The book series will build on and extend this, offering a new, important and intellectually exciting intervention into debates about work and labour, social theory, digital culture, gender, class, globalisation and economic, social and political change.

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ISBN 978-1-137-52040-1

ISBN 978-1-137-52042-5 (eBook)

<https://doi.org/10.1057/978-1-137-52042-5>

Library of Congress Control Number: 2019935563

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This Palgrave Macmillan imprint is published by the registered company Springer Nature Limited
The registered company address is: The Campus, 4 Crinan Street, London, N1 9XW, United Kingdom

Acknowledgements

I have spent most of my working life outside the protection of a permanent, tenured job, often in isolation from the academy. Nevertheless, I have been privileged to work, over the years, with a large number of fellow researchers who have provided me with intellectual stimulation, friendship and practical help and without whom it would have been impossible to carry out the work that underpins this book. There are far too many to list here, but I would like to single out a few whose contributions have been especially important to me and to this book. Leo Panitch, Colin Leys and Greg Albo at *Socialist Register* have promoted my work and encouraged me to continue at times when I was close to despair that my work would ever be recognised. Christoph Hermann provided useful comments on early draft chapters. In the co-coordination of international projects involving multifaceted research design, and the integration of teams from disparate disciplinary and national backgrounds (as well as a variety of temperaments), Monique Ramioul and Jörg Flecker have provided level-headed leadership in a manner that has been collegiate and principled, providing both personal and intellectual support. I have been immeasurably helped in the analysis of statistics by Quentin Outram, John Hall and Peter Bates. And for help with

interviews I have been lucky enough to work with Sarah Podro, who, as well as being able to carry out shrewd and insightful policy analysis on the hoof, has a unique ability to convert an unpromising rebuff from a recalcitrant informant into active cooperation through the gift of her humour, and with Simone Dahlmann, whose professionalism as a researcher and personal warmth enable her to extract quotable nuggets of gold from interviews with anyone from the CEO to the forklift truck driver. Now in the twilight of my career, I am fortunate to be working with a team who combine between them a broad range of these intellectual, managerial, quantitative and qualitative research skills: Nelli Kambouri, Neil Spencer and Kaire Holts. This book is dedicated to all the researchers I have worked with, named and unnamed, as well as the countless workers whose life stories have made up the raw material for this research and for the sake of whose future, and that of their children and grandchildren, it has been written.

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1

Introduction

When the ocean tide retreats, the underlying distribution of the ecosystem of the beach becomes visible: the arrangement of the rocks and pools and the rearrangement of the living organisms since the last low tide are re-exposed to view in new and surprising configurations, in all their shining strangeness. Just so do the recurrent crises of capitalism display the changes in the global landscape of labour, as the tides of profitability retreat. Since the last major crisis—that of 2007–2008—it has become apparent from the evidence on the newly exposed beach that represents the current state of the labour market that a number of trends that were already present in earlier years are now reaching critical mass. New patterns in the organisation of global value chains have been laid bare and new groups of workers have been sucked directly within the organisational scope of transnational corporations, under new conditions. And, as always, we struggle to make sense of the new patterns, which appear unprecedented, cataclysmic, even, impossible to describe using our existing vocabularies and difficult to categorise in our current schemata.

As the second decade of the twenty-first century draws to a close, the media are abuzz with sharply polarised debates about the future of work. Utopian visions of a post-capitalist world in which all the drudgery will

be carried out by machines and people are free to enjoy a life of leisure and creativity jostle with dark dystopian views of a future society in which the majority of the population is reduced to precarious penury under the all-seeing gaze of a panoptic authority that monitors every aspect of life. New technologies play a central role in these forecasts, whether they are seen as elevating us to the status of ‘citizen cyborgs’¹ through the use of implanted brain-machine interfaces (BMIs)² or reducing us to the status of ‘techno-serfs’ controlled by algorithms.³ Scholars, policy-makers and pundits attempting to get to grips with the potential impacts of new technologies on the economy and on daily life find the existing vocabularies inadequate (or at least insufficiently headline-grabbing) to describe them and have come up with a veritable thesaurus of new terms.

I apologise in advance for the thicket of quotation marks and footnote references in the next few paragraphs. Readers will probably be familiar with some of these terms, though not all and, even for those who have already come across most of them, encountering them *en masse* like this may feel very much like trying to swim through a kelp forest. It is, though, this very density of terminology that I want to draw attention to because of the way it impedes clarity of thought and disconnects the current discourse from past scholarship. Any attempt to make sense of the current changes therefore require, as a precondition, that we find some way to cut through this obfuscation.

So, to return to the copious literature on the future of work, are we witnessing the emergence a new kind of capitalism? Some authors suggest that we might think of it as ‘digital capitalism’,⁴ ‘informational

¹ Hughes, J. (2004) *Citizen Cyborg: Why Democratic Societies Must Respond to the Redesigned Human of the Future*, Cambridge MA: Westview Press.

² Lebedev, M. A. & Nicolelis, M. A. L. (2006) ‘Brain–Machine Interfaces: Past, Present And Future’, *TRENDS in Neurosciences*, 29 (9): 536–546.

³ Moore, M. (2015) ‘How to Stop the Tech Giants Turning Us into Techo-serfs’, *New Statesman*, February 9. Accessed on May 9, 2018 from: <https://www.newstatesman.com/sci-tech/2015/02/how-stop-tech-giants-turning-us-techo-serfs>.

⁴ Schiller, D. (2000) *Digital Capitalism: Networking the Global Market System*, Cambridge, MA: MIT Press.

capitalism'⁵ 'cognitive capitalism',⁶ 'communicative capitalism',⁷ 'bio-capitalism',⁸ 'platform capitalism'⁹ or 'surveillance capitalism'.¹⁰ Or perhaps these changes mean that capitalism as we know it cannot survive and we are actually entering a world that is 'post-capitalist'¹¹?

Other pundits do not go so far as to question the impact on capitalism as a system but argue that we need to recharacterise the economy in the digital era. Perhaps, it is suggested, we should think of it as a 'platform economy',¹² 'reputation economy',¹³ 'gig economy',¹⁴ 'mesh economy',¹⁵ 'attention economy'¹⁶ or 'sharing economy'¹⁷ in which the relationship between production and consumption has been transformed

⁵ Castells, M. (1996) *The Rise of the Network Society: The Information Age: Economy, Society, and Culture*, Volume I, Oxford: Blackwell.

⁶ Moulier-Boutang, Y. (2012) *Cognitive Capitalism*, Oxford: Polity Press.

⁷ Dean, J. (2005) 'Communicative Capitalism: Circulation and the Foreclosure of Politics', *Cultural Politics*, 1 (1): 51–74

⁸ Moroni, C. & Fumagalli, A. (2010) 'Life Put to Work: Towards a Life Theory of Value', *Ephemera*, 10 (3/4): 234–252.

⁹ Srnicek, N. (2017) *Platform Capitalism*, Cambridge: Polity Press.

¹⁰ Zuboff, S. (2019) *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*, London: Profile Books.

¹¹ Mason, P. (2015) *PostCapitalism: A Guide to Our Future*, London: Penguin; Dyer-Witheford, N. (2015) *Cyber-Proletariat: Global Labour in the Digital Vortex*, London: Pluto Press.

¹² Kenney, M. & Zysman, J. (2016) 'Choosing a Future in the Platform Economy: The Implications and Consequences of Digital Platforms', *Issues in Science and Technology*, XXXII (3). Accessed on May 9, 2018 from: <http://issues.org/32-3/the-rise-of-the-platform-economy/>.

¹³ Gandini, A. (2016) *The Reputation Economy: Understanding Knowledge Work in Digital Society*, London: Palgrave Macmillan.

¹⁴ Friedman, G. (2014) 'Workers Without Employers: Shadow Corporations and the Rise of the Gig Economy', *Review of Keynesian Economics*, 2 (2): 171–188.

¹⁵ Gansky, L. (2010). *The Mesh: Why the Future of Business Is Sharing*, London: Portfolio Penguin.

¹⁶ Davenport, T. H. & Beck, J. C. (2002) *The Attention Economy: Understanding the New Currency of Business*, Cambridge, MA: Harvard Business Press.

¹⁷ Benkler, Y. (2004) 'Sharing Nicely: On Shareable Goods and the Emergence of Sharing as a Modality of Economic Production', *The Yale Law Journal*, 114: 273–358.

through ‘peer-to-peer networking’,¹⁸ ‘collaborative consumption’,¹⁹ ‘prosumption’,²⁰ ‘co-creation’²¹ or simply ‘playbour’.²²

Others ask how we should designate the labour that is accessed in this new kind of economy: ‘the human cloud’²³? ‘liquid labour’²⁴? a ‘workforce on demand’²⁵? or a ‘just-in-time workforce’²⁶? Can the process by which atomised workers are recruited best be described as ‘crowdsourcing’²⁷ or ‘cloudsourcing’²⁸ or sourcing through ‘online talent platforms’²⁹? And should the work itself be designated ‘click work’³⁰ ‘artificial artificial intel-

¹⁸Bauwens, M. (2005) ‘The Political Economy of Peer Production’, *Ctheory.net*. Accessed on May 9, 2018 from: <https://journals.uvic.ca/index.php/ctheory/article/view/14464/5306>.

¹⁹Botsman, R. & Rogers, R. (2010) *What's Mine Is Yours: The Rise of Collaborative Consumption*, New York: Harper Business.

²⁰Ritzer, G. & Jurgenson, N. (2010) ‘Production, Consumption, Prosumption’, *Journal of Consumer Culture*, 10 (1): 13–36, following Toffler, A. (1980) *The Third Wave*, New York: Bantam Books.

²¹Prahalad, C. K. & Ramaswamy, V. (2000) ‘Co-Opting Customer Competence’, *Harvard Business Review*, January/February. Accessed on May 9, 2018 from: <https://hbr.org/2000/01/co-opting-customer-competence>; Banks, J. & Humphreys, S. (2008) ‘The Labor of User Co-creators’, *Convergence*, 14 (4): 401–418.

²²Kücklich, J. (2005) ‘Precarious Playbour: Modders and the Digital Games Industry’, *The Fibreculture Journal*, 5. Accessed on May 9, 2018 from: <http://five.fibreculturejournal.org/fcj-025-precarious-playbour-modders-and-the-digital-games-industry/>.

²³Kaganer, E., Carmel E., Hirschheim, R., & Olsen, T. (2012) ‘Managing the Human Cloud’, *MIT Sloan Management Review*, December 18: 10–14.

²⁴Accenture (2016) ‘Liquid Workforce: Building the Workforce for Today’s Digital Demands’, *Technology Vision*, Accenture. Accessed on May 5, 2017 from: https://www.accenture.com/fr-fr/_acnmedia/PDF-2/Accenture-Liquid-Workforce-Technology-Vision-2016-france.pdf.

²⁵OnForce (2017) *Workforce as a Service*. Accessed on April 24, 2017 from: <http://www.onforce.com/features>.

²⁶De Stefano, V. (2016) *The Rise of the ‘Just-in-Time Workforce’: On-Demand Work, Crowdwork and Labour Protection in the ‘Gig-Economy*, Geneva: International Labour Office.

²⁷Howe, J. & Robinson, M. (2005) ‘The Rise of Crowdsourcing’, *Wired*, Issue 14.06, June.

²⁸Vaquero, L. M., Rodero-Merino, L., Caceres, J., & Lindner, M. (2008) ‘A Break in the Clouds: Towards a Cloud Definition’, *ACM SIGCOMM Computer Communication Review*, 39 (1): 50–55; Muhic, M. & Johansson, B. (2014) ‘Cloud Sourcing—Next Generation Outsourcing?’ *Procedia Technology*, 16: 553–561.

²⁹McKinsey Global Institute (2015) *A Labor Market That Works: Connecting Talent with Opportunity in the Digital Age*, McKinsey & Company. Accessed on May 9, 2018 from: <https://www.mckinsey.com/featured-insights/employment-and-growth/connecting-talent-with-opportunity-in-the-digital-age>.

³⁰Armenti, J. (2014) ‘Click-Work or Click-Play: Crowdsourcing and the Work-Leisure Distinction’, Seton Hall University, Law School Student Scholarship. 137. Accessed on May 9, 2018 from: http://scholarship.shu.edu/student_scholarship/137; Deng, X. N. & Joshi, K. D. (2016) ‘Why Individuals Participate in Micro-Task Crowdsourcing Work Environment: Revealing Crowdworkers’

ligence'³¹ 'crowd work'³² 'digital labour'³³ or even, using an apparently oxymoronic term, 'immaterial labour'³⁴?

This by no means exhaustive catalogue of terms illustrates just some of the ways that commentators struggle to make sense of the immensity of the changes we are living through, in which all past social and economic certainties seem to be put in question. Such confusion is not new. In the 1990s there was a similar spate of hyperbole and new terminology. We heard then, for example, about the 'death of distance',³⁵ the 'end of geography'³⁶ and the rise of 'turbo capitalism'.³⁷ We were told that the economy had become 'weightless',³⁸ 'connected',³⁹ 'digital',⁴⁰ 'knowledge-based'⁴¹ or simply 'new'.⁴² We were told we were living in an 'information

Perceptions', *Journal of the Association for Information Systems*, 17 (10): 648–673. Clickworker is also the name of an online platform based in Germany.

³¹The term used by Amazon Mechanical Turk to refer to its own workforce. See also *The Economist* (2006) 'Artificial Artificial Intelligence', June 8.

³²Mandl, I., Curtarelli, M. R., Riso, S., Vargas, O. L., & Gerogiannis, E. (2015) *New Forms of Employment*, Dublin: Eurofound.

³³There is a large literature that uses this term. See for example Burston, J., Dyer-Witheford, N., & Hearn, A. (2010) 'Digital Labour: Workers, Authors, Citizens', *Ephemera*, 10 (3/4); Scholz, T. (2011) 'Facebook as Playground and Factory', in D. E. Wittkower (ed) *Facebook and Philosophy*, Chicago: Open Court: 241–252.

³⁴Hardt, T. & Negri, A. (2001) *Empire*, Cambridge, MA: Harvard University Press; Hardt, T. & Negri, A. (2009) *Multitude: War and Democracy in the Age of Empire*, London: Penguin.

³⁵Cairncross, F. (1997) *The Death of Distance: How the Communications Revolution Will Change Our Lives*, Boston, MA: Harvard Business School Press.

³⁶Graham, S. (1998) 'The End of Geography or the Explosion of Place? Conceptualizing Space, Place and Information Technology', *Progress in Human Geography*, 22 (2): 165–185.

³⁷Luttwak, E. (1999) *Turbo Capitalism: Winners and Losers in the Global Economy*, London: Orion Business Publishing.

³⁸Coyle, D. (1997) *Weightless World: Strategies for Managing the Digital Economy*, Oxford: Capstone Publishing.

³⁹Meyer, C. & Davis, S. (1998) *Blur: The Speed of Change in the Connected Economy*, South Port: Addison-Wesley, South Port.

⁴⁰Tapscott, D. (1995) *The Digital Economy: Promise and Peril in the Age of Networked Intelligence*, New York: McGraw Hill.

⁴¹Neef, D. (ed) (1998) *The Economic Impact of Knowledge (Resources for the Knowledge-based Economy)*, Boston: Butterworth-Heinemann.

⁴²A term that was widely used throughout the 1990s. See for example, Gordon, R. J. (2000). 'Does the "New Economy" Measure Up to the Great Inventions of the Past?', *Journal of Economic Perspectives*, 14 (4): 49–74. American Economic Association.

society'⁴³ and working in 'virtual organisations'⁴⁴ with workers defined as 'digital nomads',⁴⁵ 'digerati',⁴⁶ the 'cognitariat',⁴⁷ 'symbolic analysts',⁴⁸ and many other terms.⁴⁹ The developments these terms sought to describe seemed exciting and new during the late 1990s, a period of hectic and unsustainable growth—the 'dot-com boom'—that led up to a crash (the 'bursting of the bubble') at the turn of the Millennium (in which it was estimated that the worth of most internet stocks, which had peaked six months earlier, declined by 75%, wiping out \$1.755 trillion in value⁵⁰ by November 2000). But this discourse too echoed similar language from earlier periods.

As early as 1966, US management consultant Peter Drucker was using the phrase 'knowledge worker'⁵¹ and three years later French sociologist Alain Touraine coined the term 'post-industrial society',⁵² later taken up in the USA by Daniel Bell.⁵³ 'Telematics' (a translation into English of the French *télématique*) was first used in a 1978 French government report⁵⁴ reflecting a growing public debate about the economic and social impacts of the marriage of computerisation with telecommunications. Much discussion in the mass media in the 1970s focused on miniaturisation and the cheapness of the silicon chip, making the use of computers (which, up to that point had been large expensive mainframes) increasingly ubiquitous. In the UK, a BBC *Horizon* Programme, broadcast in 1978, called *Now the Chips are Down* represented a turning point in public attitudes,

⁴³Webster, F. (1995) *Theories of the Information Society*, London: Routledge.

⁴⁴Norton, B. & Smith, C. (1998) *Understanding the Virtual Organization*, Hauppauge, NY: Barrons Educational.

⁴⁵Makimoto, T. & Manners, D. (1997) *Digital Nomads*, Chichester: Wiley.

⁴⁶Brockman, J. (1996) *Digerati: Encounters with the Cyber Elite*, London: Orion Business Publishing.

⁴⁷A term originally coined by Alvin Toffler, in Toffler, A. (1970) *Future Shock* and later taken up by Antonio Negri in Negri, A. (2006) *Goodbye Mr. Socialism*, New York: Seven Stories Press.

⁴⁸Robert Reich (1991) *The Work of Nations*, New York: Simon & Schuster.

⁴⁹These and many other such terms are discussed in Barbrook, R. (2006) *The Class of the New*, London: Mute Publishing.

⁵⁰Kleinbard, D. (2000). 'The \$1.7 trillion dot.com lesson', CNNMoney, November 9.

⁵¹Drucker, P. F. (1966) *The Effective Executive*, New York: Harper and Row.

⁵²Published in English as Touraine, A. (1974) *Post-industrial Society*, London: Wildwood House.

⁵³Bell, D. (1976) *The Coming of Post-industrial Society*, New York: Basic Books.

⁵⁴Published in English as Nora, S. & Minc, A. (1980), *The Computerization of Society: A Report to the President of France*, Cambridge, MA: MIT Press.

triggering scare stories in the media about the millions of jobs it was estimated would be lost as a result of computerisation (remarkably similar to the stories in the press in the 2010s about the impact of robotisation). This was also a period when contrasting extrapolations led to predictions in the sociological literature of ‘the end of the working class’⁵⁵ or ‘the end of work’.⁵⁶ Some writers saw the new technologies as opening up the possibility for Utopias in which automation would be used to cut back the working week, and minimise the amount of socially necessary work, with the remaining time released for unalienated creative labour.⁵⁷ Others warned that the new technologies would lead to mass unemployment.⁵⁸ Among labour sociologists, the work of Harry Braverman⁵⁹ opened up new debates about the deskilling effects of new technologies.

What is clear from all this is that the discussions taking place today have precedents in other periods of restructuring. Each time a new wave of automation comes along it takes people by surprise, rocking their known world to the foundations and making them question every assumption they have taken for granted in the past, not just about how economies and labour markets work but even about the foundations of our social order. Each time it is felt that existing vocabularies are inadequate to describe the changes and that existing institutions are incapable of accommodating them. It is as though an earthquake is taking place, disrupting the familiar structures that form the bedrock of our society and give us our places in it—the educational curricula and the qualifications they confer, the ways we communicate, the skills we need to survive, the occupational structures that position us in the labour market, the satisfaction we get from our work, the security of employment we can expect and the rewards that await us.

⁵⁵Gorz, A. (1982) *Farewell to the Working Class*, London: Pluto Press.

⁵⁶Rifkind, J. (1995) *The End of Work: The Decline of the Global Labor Force and the Dawn of the Post-market Era*, New York: Putnam.

⁵⁷See, for example, Gorz, A. (1985) *Paths to Paradise: On the Liberation from Work*, London: Pluto Press and a number of publications by Ivan Illich, including Illich, I. (1973) *Tools for Conviviality*, London: Marion Boyars; Illich, I. (1978) *The Right to Useful Unemployment*, London: Marion Boyars; and Illich, I. (1982) *Gender*, New York: Pantheon Books.

⁵⁸See, for example, CSE Microelectronics Group (1980) *Capitalist Technology and the Working Class*, London: CSE Books; Harman, C. (1979) *Is a Machine After Your Job? New Technology & the Struggle for Socialism*, London: Socialist Workers Party.

⁵⁹Braverman, H. (1974) *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century*, New York: Monthly Review Press.

And in disrupting these stable features they can seem to threaten the very basis of our civilisation. As Karl Marx put it so memorably in 1848:

All fixed, fast-frozen relations, with their train of ancient and venerable prejudices and opinions, are swept away, all new-formed ones become antiquated before they can ossify. All that is solid melts into air.⁶⁰

Each change is experienced on its arrival as unprecedented and cataclysmic, wrong-footing established businesses and regulators as well as other social actors such as researchers, educators and trade unionists. Bombarded with confusing information, often couched in variants of puzzling new jargon, politicians may be urged to deregulate or reregulate, to let the market rip or attempt to control it. There is a confusing cacophony of advice—from representatives of new businesses and of old ones, from consultants, academics and self-appointed gurus—based on a shifting raft of evidence, much of it anecdotal, because there are as yet no statistics to measure the new phenomena, which have yet to be defined. Politicians may feel trapped between competing imperatives. On the one hand they seek to encourage innovation, on the other they want to safeguard jobs. They also want to be re-elected. In the ensuing rush to find solutions that keep everybody happy, it may seem as if none of the existing tools are adequate to the task and that nobody has ever had to face such difficult decisions before. But is this really the case? Could it be that it is the sense of stability and predictability most people regard as normal that is in fact illusory, and that periodic upheavals are to be expected? Is this devastating creative-destructive volatility, in fact, capitalism as usual? Or, as Bon Jovi put it in his 2010 song *the more things change, the more they stay the same*, ‘it’s the same damn song with a different melody’?

This is not an easy question to answer. I have been researching changes in labour markets and the impacts of technological change since the 1970s. In the intervening period, there have been innumerable prophecies that we are about to witness the end of the post-war model of stable, full-time, permanent employment that reached its peak in the 1950s and 1960s. At first, attention focused on the deskilling effects of digitalisation and the

⁶⁰Marx, K. & Engels, F. (1848) *Manifesto of the Communist Party*. Retrieved on May 10, 2018 from: <https://www.marxists.org/archive/marx/works/download/pdf/Manifesto.pdf>.

mass unemployment that might result from computerised automation. In the 1980s attention shifted to the potential of communications technologies to relocate employment in the form of teleworking. By the 1990s, when global telecommunications networks were in place and the Internet was born, the discourse opened up to encompass worries about offshore outsourcing of digitalised services. Now, in the twenty-first century, there are similar fears: on the one hand, a resurfacing of concerns that the use of robots will destroy skilled jobs, and, on the other, apprehension about the exponentially spreading use of online platforms for managing work.

Viewed from one perspective this can be seen as four decades of unrealised scaremongering. Eurostat figures show that over much of this period most employment in Europe remained obstinately traditional in its form. The proportion of the workforce that was self-employed hovered around 15% for decades, as did the proportion with a contract of limited duration. By 2015, it was still the case that 58% of the 221 million people employed in the EU were employees with a fulltime permanent contract while only 15% were self-employed, 12% were temporary employees and 14% were part-time employees.⁶¹

However viewed from another perspective it is this apparent stability that is deceptive. A seemingly calm surface may hide major turmoil below. Official EU statistics also show that non-standard employment is growing rapidly (from 23% among 25–39-year-olds in 1995 to 32% in 2016) and could become a majority of all employment by 2030 if present trends continue.⁶² In 2015, the International Labour Organization reported ‘a global shift away from the standard employment model, in which workers earn wages and salaries in a dependent employment relationship vis-à-vis their employers, have stable jobs and work full time. In advanced

⁶¹Broughton, A., Green, M., Rickard, C., Swift, S., Eichhorst, W., Tobsch, V., Magda, I., Lewandowski, P., Keister, R., Jonaviciene, D., Ramos Martín, N. E., Valsamis, D., & Tros, F. (2016) *Precarious Employment in Europe: Part 1: Patterns, Trends and Policy Strategy*, Brussels: European Parliament Briefing. Accessed on May 18, 2018 from: http://www.europarl.europa.eu/RegData/etudes/BRIE/2016/587303/IPOL_BRI%282016%29587303_EN.pdf.

⁶²European Commission (2017) *Working Document Accompanying Second Phase Consultation Document of Special Partners under Article 154 TFEU*, Brussels: European Commission Directorate General for Social Affairs, November 11. Accessed on January 28, 2018 from: <http://ec.europa.eu/social/main.jsp?catId=1312&langId=en>.

economies, the standard employment model is less and less dominant'.⁶³ Meanwhile, the number of workers who are not on standard employment contracts continues to rise. In the UK, for example, those on zero-hours contracts grew by three-quarters of a million between 2006 and 2016 while those on temporary contracts increased by over 200,000 in the same period.⁶⁴ So have those predicting the end of the standard employment model just been crying 'wolf'? Or are there deeper changes going on below the radar of the official statistics? Are we experiencing a temporary blip? Or could the wolf finally have arrived?

The history of forecasting future trends in employment is, in the main, a history of experts getting things spectacularly wrong. Although they might sometimes be guilty of arrogance (perhaps in the interests of self-promotion), on the whole the writers who have been so mistaken are not to blame for these errors. There are a number of reasons for their failure but it can be instructive to understand what these are in order to avoid repeating them in the future.

First, forecasts are often based on an assumption that trends are linear. While some widely-touted developments never take off, others are adopted much more widely than anticipated. In 1985 the mobile phone company Vodafone predicted that the future market for mobile phones would peak at one million. And indeed by 1995, a decade later, only 7% of the UK population owned one; but by 1998 this was about 25%, and by 1999 it was 46%, representing a 'tipping point'. In that year one mobile phone was sold in the UK every 4 seconds and by 2004 there were more mobile phones in the UK than people.⁶⁵ Simple extrapolation from existing trends is liable to produce inaccurate forecasts even using sophisticated modelling techniques that assume that adoption will adopt an 'S curve'. Sometimes forecasts are shaped by the forecaster's own hopes or fears. For example it was widely believed in the mid-twentieth century that religious observance was dying out, a prospect embraced with enthu-

⁶³International Labour Organization (2015) *World Employment Social Outlook: The Changing Nature of Jobs*, Geneva: ILO: 1.

⁶⁴Booth, R. (2016) 'More Than 7m Britons Now in Precarious Employment', *The Guardian*, November 15.

⁶⁵Wray, R. (2010) 'In Just 25 Years, the Mobile Phone Has Transformed the Way We Communicate', *The Guardian*, January 1. Accessed on May 20, 2018 from: <https://www.theguardian.com/business/2010/jan/01/25-years-phones-transform-communication>.

siasm by secular humanists and with trepidation by those who thought that this signalled the destruction of the moral foundations of society. Neither group anticipated the revival of religious fundamentalisms that took place in the last quarter of that century. However it is possible that both groups contributed indirectly to that very revival by a process that brings us to the second reason why forecasters so often get things wrong.

This is the phenomenon that philosophers call ‘dialectics’—the way in which actions provoke reactions, which in turn provoke counter-reactions. Social behaviour provides innumerable examples of this: young people react against their parents’ values when they find these constricting; workers resist exploitative practices their employers are trying to impose on them; marginalised social groups develop counter-cultures; elite groups join forces to protect their privileges. Multiplied across whole societies these practices can serve to shape and reshape history in ways that cannot be anticipated easily because they depend on the balance of forces in any given situation. In some situations such collective reactive behaviour can serve to reinforce conservatism and impede change; in others it can gather volume like a snowball and bring about a major social and cultural shift, like the ‘sexual revolution’ of the 1960s. But of course each change sets in motion the dynamics of the next.

Linked to these dynamics of resistance and reaction are other features of change that make it difficult to predict the future, sometimes referred to as ‘unintended consequences’. When new technologies are introduced, for example, it is often assumed that they will be used for the purposes their designers originally had in mind. To return to the example of the mobile phone, when these were first introduced it was assumed that they would be used as substitutes for fixed phones by the affluent. And indeed they did become something of a status symbol for traders in financial centres like the City of London in the 1980s. What was less anticipated was that among the other early adopters would be people who had good reason to want to keep their location secret and avoid being listed in telephone directories, such as drug-dealers, pimps and other criminals. Similarly some of the earliest commercial users of the Internet in the 1990s were pornographers and vendors of off-prescription drugs. By the twenty-first century the ‘dark web’ had become a reality and the annual cost of cybercrime was estimated

by Forbes magazine at \$6 trillion.⁶⁶ Meanwhile drones are being used to smuggle drugs, guns and mobile phones into prisons and across national borders, not to mention potential terrorist uses, while medical advances are misused for purposes as varied as organ harvesting and date rape. In other words, any new technology is liable to be used for harmful, as well as beneficial purposes. Attempts to outlaw or manage these socially harmful activities have further consequences. They may, for example, give rise to new industries designed to prevent hacking or enhance surveillance, but these may also create new social risks for the general population ranging from the minor annoyance of having to repeatedly enter, and change, passwords to more serious constraints on personal freedom or invasions of privacy.

Attempts to predict the future must therefore factor in the impacts of unintended consequences as well as those of resistance and reaction to change. But this is not all. They must also take account of a fourth factor: inertia. 'If it ain't broke, don't fix it' is a principle that many adopt in their lives and abandon only with extreme reluctance. In fact some cling to their existing practices as long as possible and only change when forced to do so because the old solutions have become unavailable or unaffordable or survival depends on being similarly equipped to neighbours, family members, suppliers or customers. What may seem like an occasional stubborn exception to a larger trend can, when multiplied across a whole population, present obstacles to change of larger statistical significance, forcing companies and policy makers to continue offering the old options alongside the new ones that replace them: both analogue and digital radio, for example; both fixed-line and mobile phone networks; both printed books and ebooks; both shops and websites. This introduces additional distortions for forecasters to deal with and may even add extra costs and complexities in areas where economies were expected.

When it comes to more specific predictions about the future of work, a range of other considerations also come into play. Some of these are related to the way that existing labour markets are currently charted, for instance by focusing only on the existing economic landscape and, using

⁶⁶Eubanks, N. (2017) 'The True Cost of Cybercrime for Businesses', Forbes, July 13. Accessed on May 20, 2018 from: <https://www.forbes.com/sites/theyec/2017/07/13/the-true-cost-of-cybercrime-for-businesses/#182086b54947>.