Widespread use of the Internet and the Web has transformed the public management ‘quasi-paradigm’ in advanced industrial countries. The toolkit for public management reform has shifted away from a ‘new public management’ (NPM) approach stressing fragmentation, competition and incentivization and towards a ‘digital-era governance’ (DEG) one, focusing on reintegrating services, providing holistic services for citizens and implementing thoroughgoing digital changes in administration. We review the current status of NPM and DEG approaches, showing how the development of the social Web has already helped trigger a ‘second wave’ of DEG changes. Web science and organizational studies are converging swiftly in public management and public services, opening up an extensive agenda for future redesign of state organization and interventions. So far, DEG changes have survived austerity pressures well, whereas key NPM elements have been rolled back.

1. Introduction

Things take longer to happen than you think they will, and then happen faster than you thought they could.  

Larry Summers

Digital changes made feasible by Internet- and Web-based technologies and applications have moved to centre stage in many academic disciplines. They are increasingly vital to executive government operations in all advanced industrial states, albeit with a ‘culture lag’ compared with business and many civil society adaptations. Public administration and public management scholars remain divided about these developments, however.
The erstwhile dominant academic ‘quasi-paradigm’ of ‘new public management’ (NPM) marginalized technological changes in favour of a managerialist emphasis on organizational arrangements and strong corporate leadership. NPM stressed a trinity of macro-themes—disaggregation (chunking-up government hierarchies into smaller organizations); competition (especially with private-sector contractors but also in internal quasi-markets within government); and incentivization (built on pecuniary motivations instead of professionalism). From 1980 to around 2005, the NPM wave was moving strongly forward across many countries (with distinct emphases in different countries) [4]. However, NPM always prioritized managerialist elements and assigned little intellectual significance to digital developments.

We have argued elsewhere that a change of quasi-paradigms in public management reform has now occurred, partly because the NPM wave ground to a halt in most advanced industrial countries, amid growing signs of crises and contradictions. This argument does not deny that NPM arrangements are still being implemented, and indeed occasionally being revived in some new contexts. Of course, even in the Kuhnian theory of shifts in scientific paradigms, the legacy view normally remains in being and is extensively used for many years. Its remaining exponents often fight lengthy rearguard actions against the ideas that intellectually supplant it. In fields such as public management, with weak testing processes and unclear criteria of plausibility, then a quasi-paradigm that is superceded at the innovation frontier can remain in routine use for many years, and enjoy short-lived spasms of reuse.

The second part of a quasi-paradigm shift of ideas entails the emergence of a single competing approach, perhaps sparsely supported at first, but gathering momentum over time, and generating ‘swarms of ideas’ and implementations that support it. We have put forward the digital-era governance (DEG) model to represent such a shift [5,6]. A number of other ‘post-NPM’ shifts of ideas have been proposed, including a re-emphasis upon neo-Weberian ideas, or alleged ‘post-bureaucratic’ modes of organization [7–9]. However, the evidence cited for all these successor ideas is scattered and unconvincing, especially because pervasive patterns of digital changes remain peripheral in all these accounts. This reflects a long-running tendency of public administration to marginalize technological factors, a view that some authors have argued should be fundamentally reappraised [10,11].

We set out here the case that a second wave of DEG change is currently sweeping through government, powered by the development of social media. It gains extra impetus from new austerity pressures for the extensive implementation of digitally based cost-saving processes; and from the extraction of real productivity gains from the maturing of earlier waves of digital change from the late 1990s to the mid-2000s. The cyberpunk novelist, William Gibson, is known for his claim that ‘all cultural change is essentially technological’, but he has few social science followers, and this is not our position. The DEG model stresses the importance of digital change, but not in any determinant way, rather assigning equal importance to two other components—organizational reintegration within governments (which fosters disintermediation), and needs-based holism (re-unifying government services around client groups, instead of ‘business processes’).

1A ‘quasi-paradigm’ has certain resemblances to the full Kuhnian scientific paradigm, especially in terms of (i) having two levels, with an overall macro-theory that orientates, justifies and pulls together a wide range of detailed implementations, methods and supplementary concepts and (ii) being marked by rapid transitions from one dominant macro-theory to its successor, when a substantial accumulation of problems occurs with the previous view. However, as Kuhn [1] stressed, paradigms in science are distinctive and exceptional, because theories must meet very strong logical coherence criteria for credibility, and they are tested far more rigorously in evidence-based ways than other ‘knowledge’. These conditions do not apply even in the social sciences, still less in non-academic spheres of life. In the past, in public administration and public management, many individual nostrums or ‘parables’ were influential, chiefly for rhetorical or political reasons [2,3]. However, in our view quasi-paradigms have replaced earlier propositional-level arguments as key vehicles of public management thought. Causal influences here have been the growth of evidence-based social science, faster and wider comparative policy-learning, the development of ‘best practice research’, and the growth of think tanks and other organizations at the interface between academia and public policy. These developments have boosted and speeded up institutional processes for sifting and selecting out what works in public management, albeit in a rough way. These changes especially focus on shifts of quasi-paradigms in response to crises or problems accumulating with existing approaches.
Figure 1. The shaping of first and second wave digital-era governance. (Online version in colour.)

The argument for a shift of quasi-paradigms is summarized below (figure 1), especially the growing lack of fit between NPM solutions and the macro-trends in business and wider society towards digital era processes. Originally a potent means of administrative modernization in the 1980s and 1990s, NPM first ossified and then ran into major crises by the early 2000s. The first wave of DEG changes represented an orthogonal shift in the trajectory for government modernization. Since 2010, social Web developments have contributed to a further bending of the modernization main course away from NPM patterns, and a stronger differentiation of the three DEG themes (reintegration, holism and digital changes) from the previous quasi-paradigm. The DEG approach remains ‘insurgent’, an ‘ideal type’, and its implementation is patchy in even the most ‘advanced’ industrial states. However, its intellectual and innovation momentum is building, its coherence and acceptance as a quasi-paradigm is expanding, and its growth is continuing under potentially adverse austerity conditions. Our argument has three parts, considering first the decline of NPM, and then the growth of DEG. We then focus on ‘second wave’ developments in the three DEG macro-themes of reintegration, holism and digital change.

2. New public management as a legacy view

The three macro-themes of NPM were immensely influential for more than two decades.

— Disaggregation involves splitting up the large bureaucracies developed on Weberian lines in the post-war ‘progressive public administration’ period. Key aspects of this change from the 1980s to 2000 were the agencification of central government functions, more use of quasi-government agencies, creating micro-local agencies (such as locally managed schools and hospitals) and introducing purchaser–provider separation.

— Competition moves away from bureaucratic monopoly providers and introduces alternative suppliers via mandatory competition, outsourcing, strategic review, quasi-markets, deinstitutionalization, asset sales, consumer-tagged financing and deregulation.
Incentivization emphasizes the need to design economic or pecuniary motivations for actors or organizations forcing them to make ‘the best’ use of time, assets and resources. Key tools here include privatization, private finance initiative (PFI) schemes and public-private partnerships, performance-related pay, user charging, public sector dividends and ‘light touch’ regulation (as in banking before the 2009 financial crisis).

From the 1980s onwards, each of these themes influenced heavily how governments across the developed world approached reform, although in different countries at different times. The approach was over-developed in some countries, particularly the UK, Australia and New Zealand (all early adopters). In others, there was no such overarching injection of NPM, but rather the use of individual components, such as privatization of railway and telecoms in Japan, agencification in Canada, and private and voluntary sector service provision at local government level in the Netherlands (see [12, pp. 96–105]).

How have these elements fared in the most recent times, since 2005? Most of the disaggregation components have decreased in use. Austerity pressures have particularly borne down hard on NPM’s emphasis on strong corporate management of individual organizations, agencification and the growth of quasi-government bodies, all of which necessarily duplicate expensive management structures. However, the separation of micro-local agencies has tended to benefit from pressures to cut spending and from favourable, decentralizing shifts in information and communication technologies (ICTs) and management technologies, so its decline is less prevalent, particularly in the education sector. Externalizing services from the government sector to off-budget bodies also has some political attractions in austerity conditions, so long as it does not boost total costs.

The competition components have generally fared better, and are now routinized into public management toolkits in many countries. Yet, the old evangelical fervour that expected outsourcing to generate significant savings, culture change or innovations in public services delivery has largely evaporated [13,14]. In Sweden and the UK, the use of ‘free schools’ run by parents, voluntary bodies or profit-making firms could be seen as increasing competition. However, the aggregation of outsourcing and PFI contracts via the secondary markets for these contracts has often worked against competition, ‘heroically’ re-aggregating service provision tasks initially allocated to separate providers, with potentially disastrous results. For instance, in the UK, a social care for the elderly firm went bankrupt in 2011, jeopardizing care for its 31 000 residents. Quasi-markets failed fairly conclusively twice in health services in the UK and Italy in the 1990s. The UK’s Conservative–Liberal Democrat government has tried again in the National Health Service, scrapping 152 ‘primary care trusts’ in favour of 250 ‘family doctor commissioning units’. But the reorganization legislation has run into very strong professional opposition and public controversy, with external experts costing £3.5 billion [15] and criticisms that the changes were ‘zombie NPM’ from a decade ago [16,17]. The law was chronically delayed and heavily amended in 2012. Other parts of the competition theme have fared badly as austerity pressures mount, essentially because they cost money to implement, a factor that also explains the general non-adoption of vouchers. Some autonomous influences have tended to increase user control and consumer-tagged financing, although mainly in forms actually distinctive to DEG changes.

The incentivization components of NPM remain potentially available to modern managers. But all are costly and difficult to use, and experience has shown that many innovations (such as accrual accounting and budgeting) have had either few or net negative impacts (in Australia for example). Austerity pressures have been inimical to the NPM enthusiasm for performance measurement and much of the additional surveillance introduced by NPM’s ‘audit explosion’ [18] is already being cut back as not adding value. Involving capital markets in projects has proved very expensive in the UK’s PFI programme, leading to high charges and re-financing problems. The mechanism was abandoned in the UK for IT projects in 2003 and superceded for construction projects in 2011 [19]. Public–private sector partnerships have fared fairly well in some close-to-the-private-sector areas, such as air traffic management [20]. But they also created instability
in cases where the private capital provider can no longer generate a flow of private finance to cover its share of investment programmes, leading to the forced transfer of the relevant risks back to government, again at high cost. Performance-related pay and efforts to spread pecuniary (instead of professional or public service ethics) incentives are clearly squashed by public sector pay freezes. Moves towards light touch regulation regimes have declined sharply after the credit crunch, with a re-tightening of regulation and new attention to macro-risks, especially around financial markets and institutions. New financial regulation architectures have been established in the USA, UK and Europe for ensuring implementation at a systemic level—as opposed to NPM’s emphasis on disaggregated, single-organization-focused controls, which failed so severely in the credit crunch in the UK and USA. Of all the incentivization components that spread widely, it is unifying rates of return and demanding mandatory ‘efficiency dividends’ from spending departments that have been boosted by austerity pressures.

The first part of a shift in quasi-paradigms is the accumulation of ‘puzzles’ in the previous dominant approach, weakly analogous to a Kuhnian shift in scientific paradigms. Warning signs of the obsolescence of NPM ideas were at first dismissed by some commentators as ‘paradoxes’ of being ‘middle-aged’ [21]. But the onset of widespread economic austerity conditions in European governments since the 2008–2010 financial crisis, and the wider collapse of neo-liberal consensus that had previously supported NPM have brought more assertive challenges to its semi-paradigmatic status, for instance in regulation: ‘Faith in the ideas that had propelled reform was shattered’ [22, p. 3]. ‘The broad ideas that have underpinned economic policy and public sector reform over the past 30 years or so have been left exposed in the light of market and regulatory failings during the financial crisis’ [23, p. 83]. And Lapsley [24] argues that widespread use of NPM was often a ‘cruel disappointment’ for governments. There is still some scholarly dissent. For example, some American authors continue to believe that NPM and the use of complex network structures spanning multiple tiers of government and webs of contractors and sub-contractors can save governments money [25], a stance softened now to a belief in ‘collaborative government’ [26]. And de Vries [27, p. 4] argues that: ‘the NPM paradigm is in trouble but . . . it is still far too early to speak in terms of a third order change, let alone the fact that a traditional paradigm never completely disappears’. As a result, he claims, NPM ‘is not really dead’.

However, it is difficult to identify any substantial sets of NPM components that are growing in use in ‘cutting edge’ countries such as the UK or Scandinavia, or NPM initiatives that politicians or officials widely expect to realize fundamental changes in the operation of public management. As discussed earlier, the stalled UK health service reforms evoked large-scale opposition to ideologically based changes, previously accepted in the UK without much dissent. Certainly, some elements of NPM are still widely used in many countries, and we can expect generations of civil servants and managers socialized into the NPM approach to keep this way of handling issues in being for some time to come. There may also be pushbacks to NPM ways of working when right-wing parties (closer ideologically to the pro-market rhetoric of NPM) come to power.

Clearly, austerity measures have opened up some possibilities for governments to seek to save money (or at least to switch costs across budget headings) by involving private contractors in service provision, especially in countries (such as Greece) where this might be a way of forcing through de-privileging of entrenched public sector unions and benefits. But in mature NPM countries, private involvements in public service provision have generally proved expensive over time. Governments with the strongest austerity pressures have reacted by shutting down change programmes, expelling consultants, squeezing contracts, drastically curbing incentive payments to top officials and renegotiating public–private partnerships.

For our purposes, the key focus is on how NPM has handled digital change issues. In the early 1980s, NPM proponents for a few years claimed that promoting a greater use of IT in public administration was an aspect of their pro-business orientation. This was always an unconvincing aspect of the overall NPM movement and it soon petered out, although one or two contemporary critics seem to claim that all major IT projects somehow have an NPM character, and hence are programmed to fail [28]. In fact, NPM’s managerialist emphases upon strong leadership and organizational fragmentation have always sat uncomfortably with an
3. Digital-era governance

In our view, handling digital change effectively requires a new macro-theory of public sector development, and radically different mindset, culture and characteristic patterns of organizational governance [5,6]. This DEG approach works with the grain of business and civil society changes, within an overall pathway of social modernization that has changed dramatically with the development of the Internet and online social processes, and has been widely discussed [29]. In particular, the first wave of DEG (DEG1) focused on macro-themes accompanied by many different (‘swarms of’) small changes, again weakly analogous to Kuhnian scientific paradigms [30], focusing on methods, practices and ways of seeing. Three themes stand out.

— **Reintegration**, which reverses the fragmentation of NPM by joining-up and trying to de-silo public sector processes. It stresses bringing back genuine partnership working; ‘re-governmentalizing’ issues that must inherently be handled by the state (as with homeland security); creating new central government processes to do things once instead of many times; squeezing process costs and using shared services to drive out NPM’s duplicate organizational hierarchies; and aiming at radical simplification of services organization and policies.

— **Needs-based holism**, which is a thoroughgoing attempt to create client-focused structures for departments and agencies. It seeks to implement end-to-end redesign of services from a client perspective; to put in place one-stop processes (whether windows, or e-windows, or fully integrated one-stop shops); and to create agile and resilient government structures, that can respond in real time to problems, instead of catching up with them only after long lags. The contrast here is with the brittle, inflexible and complex structures that NPM typically produced.

— **Digitalization** covers the adaptation of the public sector to completely embrace and imbed electronic delivery at the heart of the government business model, wherever possible. For instance, this stance is advanced by e-government efforts at digitizing interactions with citizens and businesses; new forms of automation using ‘zero touch’ technologies that do not require human intervention; and radical disintermediation, the effort to strip out layers of redundant or non-value-adding processes from service delivery. As in private services, this will partly involve making (able) citizens do more, developing isocratic administration—or ‘do-it-yourself’ government.

The DEG thesis carries no connotations of technological determinism or predominance. The three main themes are first organizational and budgetary factors internal to the state apparatus (reintegration); second, citizen- and client-orientated factors in public services (holism); and only third, influences from the societal adoption and cultural adaptation of technological drivers (digital change).

Anticipating the further development of the DEG model involves understanding what the salient impacts of ICT changes have been in the private sector, especially regarding organizational centralization or decentralization. We draw here on the argument made by Bloom *et al.* [31] that in fact modern ICT changes have had complex, indeed dialectical (i.e. partially contradictory), implications for organizational arrangements in business. These authors break down the increasingly meaningless term ‘information and communication technologies’ (which morphs together communication and information effects) into two somewhat dialectical organizational responses to digital technologies. First, **networking (or communication)** effects are centralizing. The ability to collect information from more and more data points, and to
systematize it and analyse it in real time, means that in modern businesses increased spans of control are possible. Higher tier decision-makers can now keep tabs on more subordinates, be periodically involved in more decisions, insist on being consulted in real time and intervene more speedily when the key performance indicators go off-trend. Consequently, middle management in modern corporations has reduced, with substantial delayering leading to wider, flatter hierarchies.

Yet simultaneous and equally strong database (or information) effects have been decentralizing. Modern workers can now access immediately far more information relating to their jobs than their predecessors, whether in services or manufacturing industries—meaning that grassroots staff can now handle more problems themselves, without appealing to superiors. The information they need on adjustments, complications, routines, special case procedures and so on can be instantly available in making manufacturing decisions or at the point of service. Equally, lower-tier managers can now handle a wider range of issues without asking for guidance from higher-tier offices. Thus, the same number of (better-educated) staff can now handle multiple problems and issues. This effect shifts the locus of decision-making down the organizational hierarchy. Because digital change in government generally lags trends in the business sector, Bloom et al.’s carefully evidenced findings from the private sector are highly likely to apply also in public management.

From the mid-2000s, the rapid growth of business exploitation of massive transactional databases and of social media to hone advertising, marketing and product development processes has created pressures for a second, new wave of transformation within government. This DEG 2 wave is still emergent in most countries, but has begun transforming organizational governance and perhaps the very nature of bureaucracy in those countries at the forefront. In the very early phases of computerization in the 1950s and 1960s, governments in developed nations were innovators, leading the way in developing systems and applications [11]. But with the Internet and particularly the social Web, citizens and companies are innovating with new technologies much faster than ever before, and far more quickly than states can respond. So developments such as analysing ‘big data’ from transactional processes [32], peer production [33], the ‘democratization of innovation’ [34], ‘crowdsourcing’ [35], ‘wikinomics’ [36], ‘cognitive surplus’ [37] and ‘network effects’ [38] put pressure on government organizations to innovate in catch-up mode and modernize their dealings with citizens. We trace ‘second wave’ changes within each of the three DEG macro-themes.

4. Reintegration in DEG 2

The Web-based push to integrate services extends quickly into more fundamentally re-engineering services and removing duplicate service delivery chains. In austerity conditions, reintegration saves governments money by pulling functions back from executive agencies into central ministries; cutting out the extra management costs of multiple agencies; and recentralizing controls over spending and over areas such as the online Web estates of public sector agencies. Many Organization for Economic Co-operation and Development (OECD) countries are now reversing agencification and quasi-government agency fragmentation, seeking to reduce their numbers of central agencies and even ministries (optimally, to less than 15 ministries according to recent studies [39,40]). So we might expect to see most reintegration elements increasing and spreading, and this is shown in table 1, which groups the most salient contemporary developments into two columns—centralizing and network-based changes, or decentralizing changes stemming from database improvements (following Bloom et al. [31] discussed earlier). Table 1 also separates out the two waves of DEG innovations. For the more established DEG 1 changes, it indicates the general status of the element (growing, static or declining) and its compatibility with austerity pressures. The only DEG 1 component that has lagged is shared services, where in the UK some ambitious schemes have failed to deliver on expected gains, although some changes are still working through at a routinized, bureaucratic level.
Table 1. The progress of reintegration elements in the first and second waves of DEG. The symbol ▲ denotes growing and the symbol ∼ denotes widely used but not developing further. [A+] boosted by austerity pressures, [A−] constrained by austerity imperatives.

<table>
<thead>
<tr>
<th>first wave reintegration</th>
<th>centralizing, networks-based, communications gain developments</th>
<th>decentralizing, database-led, information processing gain developments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>rollback of agencification/fragmentation ▲ [A+]</td>
<td>re-engineering service delivery chains—de-duplication ▲ [A+]</td>
</tr>
<tr>
<td></td>
<td>joined-up governance ▲</td>
<td>shared services ∼ [A+]</td>
</tr>
<tr>
<td></td>
<td>re-governmentalization (especially during credit crunch) ▲ [A−]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>reinstating/strengthening central processes ▲ [A+]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>procurement concentration and specialization ▲ [A+]</td>
<td></td>
</tr>
<tr>
<td>second wave reintegration</td>
<td>intelligent centre + decentralized delivery design [A+]</td>
<td>intelligent centre + decentralized delivery design [A+]</td>
</tr>
<tr>
<td></td>
<td>single tax and benefit systems (using real-time data) ▲ [A+]</td>
<td>‘big data’ analysis ∼</td>
</tr>
<tr>
<td></td>
<td>reintegrative outsourcing [A]</td>
<td>central government disengagement and load-shedding [A+]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>delivery-level joined-up governance ▲ [A+]</td>
</tr>
</tbody>
</table>

For the future, the most critical trend for reintegration (particularly for states under austerity pressures) is a move towards an ‘intelligent centre/devolved delivery’ (IC + DD) design in the allocation of functions across tiers of government. This strategic design is imported from successful private corporations such as Walmart (in the USA) and Tesco (in the UK, where it accounts for £1 in every £8 spent by consumers). In retail, this approach means that comprehensive sales and customer information data are collected electronically at store level (from tills and loyalty cards) to create a ‘big data’ warehouse, which is analysed centrally by specialist analyst units and central management. The centre then settles strategic decisions, procures products in a unitary way across thousands of suppliers and distributes them into stores. Famously, Walmart’s response to Hurricane Katrina was much more effective than the federal government’s, because in intelligent design, it is not left to local decision-makers (individual store managers) to set policy or undertake procurement. Their role is solely to handle customers, recruit and roster staff (into much more complex working patterns than a decade ago), and coordinate the final logistics of ‘just-in-time’ deliveries to their store. Online sales also either cut stores out of the delivery loop altogether, or use stores just as convenient fulfilment or picking-up points for customer choices logged centrally.

Such IC+DD organizational architectures are so far almost a mirror image of most contemporary governments, especially in federal states. This level of integration is in evidence only in Scandinavia, where data-pooling across tiers of government is historically long-lived. Almost everywhere else, central or federal governments are poorly informed about what state or local governments are doing, relying on dated and specially collected national statistics or intra-governmental reporting systems (often limited by constitutional and political constraints) in order to understand demand trends, a far cry from Walmart’s real-time electronic updating at central and regional levels of purchase patterns. Real-time government data-pooling from local to regional and national levels is rare, although some bits of such a system have begun to emerge
in intelligence and surveillance policy in the USA since the attack on the World Trade Center in 2001, and in some European states’ homeland security arrangements. If governments were able to follow the private sector in starting to maximize the potential of digitally generated ‘big data’ that transcends organizational boundaries, there is potential for policy innovation (e.g. preemptive needs analysis) and massive cost savings (predicted by Manyika et al. [32] at more than 100 billion euros for European governments alone).

Other moves could include a merging of some elements of tax and welfare systems. Since the foundation of tax systems and welfare state provisions, it has been axiomatic that governments should (i) run their own databases collating data separately from civil society systems and (ii) run separate tax and social security systems, initially for quite distinct populations. However, in the modern period, most citizens have become both taxpayers and recipients of state benefits, so why maintain records on the same people twice? The most cash-strapped ex-NPM state, the UK, is now querying both premises, looking at creating a single, integrated real-time system for taxing and paying social security, one that would draw on the banking system’s existing national infrastructure. The policy labels here are real-time information in tax and ‘universal credit’ (in social security). In the long term, immediate responsibility for levying taxes might shift from employers (via the pay-as-you-earn systems operating in most advanced industrial states, even the USA via ‘withholding’) and responsibility for paying tax credits and welfare benefits might shift from the government bureaucracy. In both cases, the collection or disbursement of monies would be transferred to the banks, who would tax or disperse additional funds in response to government-issued instructions and tokens in real time. This would be the ultimate ‘intelligent centre’ design for the welfare state. Elements of it already exist in Scandinavia, where the tax system is approximately 15 years ahead of that in the UK, and taxpayers can see their whole income and tax liabilities by email or mobile phone at the start of each year, and sign off their agreement with an assessment via a text message.

Among decentralizing second wave reintegration changes, the key stimulus from austerity pressures has been for central government to disengage from supporting many services it previously co-funded, thrusting more of the burden on to state or local governments (as with earlier austerity episodes, such as Canada in 1992–1995). In the UK, Denmark and other countries, this has intensified strong pressures for the rationalization of multiple differentiated public service delivery chains, now seen as unaffordable ‘luxury goods’ [41]. The key implication is the joining up (eventually merging) of previously separate delivery chains, adding to the DEG₁ pressures for one-stop shops and windows.

5. Holism in DEG₂

Reorganization of public service provision around clients’ needs (such as end-to-end service re-engineering) costs money upfront, and takes time to implement and yield savings. These ‘invest to save’ characteristics of holistic reorganizations do not fit well with short-term pressures for financial cutbacks, as table 2 shows.

Yet, there are also three generally growing holism components. At a decentralized level, client-focused reorganization and one-stop processes are both growing for service-improvement reasons, despite austerity pressures. Some elements (such as lead agency arrangements, budget pooling and shared chief executives or services) can also save money [41]. At national government levels, pressures for more agile government structures continue to increase, reflecting the development of ‘risk society’ issues (such as cross-national terrorism, pandemics, energy security and similar issues) to central political prominence [42]. Some governments have begun to experiment with more flexible ‘directorate’ structures than traditional central departments, supported by ‘government cloud’ IT and central services arrangements.

Other elements of the needs-based holism macro-theme are multiplying and proving to work consistently with the grain of austerity measures. Among the key centralizing trends is the migration of social security systems online, more than a decade after national tax systems. (In the UK in 2009, three quarters of submissions of self-assessment tax forms were online [43].) Key
Table 2. The progress of holism elements in the first and second waves of DEG. The symbol ▲ denotes growing and the symbol ∼ denotes widely used but not developing further. [A+] boosted by austerity pressures, [A–] constrained by austerity imperatives.

<table>
<thead>
<tr>
<th>First wave holism</th>
<th>Centralizing, networks-based, communications gain developments</th>
<th>Decentralizing, database-led, information processing gain developments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interactive and ‘ask once’ information seeking ∼ [A+]</td>
<td>— Agile government processes ▲ [A–]</td>
<td>— Client-based or needs-based reorganization ▲ [A+]</td>
</tr>
<tr>
<td>Agile government processes ▲ [A–]</td>
<td>— One-stop provisions, ask-once processes ▲</td>
<td>— End-to-end service re-engineering ∼</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Second wave holism</th>
<th>Centralizing, networks-based, communications gain developments</th>
<th>Decentralizing, database-led, information processing gain developments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social security systems moving online [A+]</td>
<td>— Social security systems moving online [A+]</td>
<td>— Jointed-up local delivery of public services [A+]</td>
</tr>
<tr>
<td>Linked-benefits approvals and payment integration [A–]</td>
<td>— Linked-benefits approvals and payment integration [A–]</td>
<td>— Client-managed social/health care budgets</td>
</tr>
<tr>
<td></td>
<td>— Development of ‘social Web’ processes within online government services [A–]</td>
<td>— Development of ‘social Web’ processes within online government services [A–]</td>
</tr>
<tr>
<td></td>
<td>— ‘Big society’ changes linked to central disengagement [A+]</td>
<td>— ‘Big society’ changes linked to central disengagement [A+]</td>
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Pioneers of the major changes needed to facilitate online interactions have been the US Social Security Administration, which moved the registration for the state pension decisively online in late 2009, with major savings in time and costs. The Swedish government also has an online-only access scheme for subsidizing parents taking time off work to care for ill children. The UK Department for Work and Pensions belatedly responded to an unemployment surge in 2009 by bringing in online registration for unemployment assistance (called job seekers’ allowance) and a policy of moving 80 per cent of customer transactions online (a huge change from a level of below 1% in 2008), following a critical audit report and evidence that social security productivity had remained almost unchanged for two decades [44–46].

Pressures for ‘universal benefits’ integration in the UK and elsewhere (discussed above), aimed in part at capping welfare payments to any one family, also chime with the ‘holism’ theme. So do new European government efforts to operationalize single ‘citizens accounts’ which will give online access to all interactions with government (rather like a government equivalent of online banking services). More partial integrated service shops online, and with regional or big city offices, have also been pioneered by Access Canada; and by the Australian transfer of its Medicare scheme to the integrated agency handling its social security and job placement services, Centrelink.
Decentralizing holism components are also growing strongly and morphing into efficiency changes in countries with the strongest austerity pressures. Cutbacks have boosted joined-up local delivery, with separate government delivery chains being merged. A push towards government co-production of services with citizens has been very clear in behavioural public policy fields, the ‘nudge’ territory of changing life choices [47], where even more interventionist European governments acknowledge that government-only interventions are unlikely to be successful. In the UK, there has been a push to replace top-down national regulatory controls over local delivery in hospitals, schools and local governments with online customer feedback mechanisms (such as the large UK website NHS Choices) and transparency initiatives that open up expenditure data to public scrutiny. The hope is that instant patient and family feedback on hospitals will substitute for previous long-winded and after the fact regulatory investigations of problems, which conspicuously failed to prevent service delivery disasters [48]. Early Web science studies of such initiatives suggest that customer testimonials accurately identify hospitals with patient care problems [49], paralleling findings in the USA that Google searches for flu symptoms provide accurate advance indicators of the regional and local spread of flu cases, beating federal Centers for Disease Control and Prevention monitoring at least on timeliness [50]. Similarly, the coalition government in the UK has followed a few US states and abolished its previous key regulator over local government, the Audit Commission, requiring instead that all local councils publish details of their spending over £25,000, with the claim that an ‘army of citizen-auditors’ would replace central controls. Online access to all open-data information, and the participation of non-governmental organizations (NGOs) and groups building applications that reprocess data for public consumption, might both move co-production of services (in this case, regulatory functions) into a new era.

Citizen-oriented holism is also reflected in the shift away from NPM managerialist strategies, with their stress on ‘leaderism’ and strong ‘corporate’ organizational governance, both heavily dependent on high levels of senior officials’ performance pay [51]. Recent economic theory has seen a radical reappraisal of the virtues of ‘mission commitment’ in terms of sorting staff and clients across public sector agencies, and creating pooling effects favourable to better performance at lower cost [52]. This insight has subsequently been morphed by some thinkers on the political right into a ‘red Tory’ emphasis on worker empowerment within the public sector, as well as ‘big society’ externalizations of roles to NGOs and community organizations [53].

The key DEG2 push for holism in the future is likely to involve the development of ‘social Web’ processes within the government sector, with new organizational forms exploiting the capacity of the Internet and mobile access to ‘organize without organizations’ [54] and new forms of ‘co-production’ and even ‘co-creation’ of government services [55]. For instance, in some Swedish cities, the care of mentally handicapped people has begun to move into mixed care circles, bringing together state professionals and family/friends. Such care networks can be coordinated in real time via online ‘social Web’ mechanisms that make everyone’s information available to all partners. Similar schemes, plus the growth of e-healthcare regimes, are likely to be key to the next digital revolution in care of the elderly and long-term sick, chiefly through government-run schemes [56] but perhaps also through privatized provision in the USA and European style, fund-based healthcare systems. In the UK, the government has launched telecare and e-health schemes aiming to reach three million people with non-communicable diseases (such as diabetes and heart problems) to co-monitor their conditions [57]. E-monitoring of medication dosage for elderly or confused patients is another area of intense significance for public health systems. So far, these initiatives have survived cutbacks but remain under threat from austerity pressures, as does the personalization of care budgets, another growing trend.

6. Digital change in DEG2

The wave of digital change that lapped at the edges of government bureaucracies in the e-government period has continued to build up, with new disruptive changes from social media, ‘the Internet of things’, open-book governance and many other elements. Consequently, table 3
Table 3. The progress of digital change elements in the first and second waves of DEG. The symbol ▲ denotes growing and the symbol ~ denotes widely used but not developing further. [A+] boosted by austerity pressures, [A−] constrained by austerity imperatives.

<table>
<thead>
<tr>
<th>First wave digital changes</th>
<th>Centralizing, networks-based, communications gain developments</th>
<th>Decentralizing, database-led, information processing gain developments</th>
</tr>
</thead>
<tbody>
<tr>
<td>— radical disintermediation (cut out the middleman) ▲ [A+]</td>
<td>— e-government ▲ [A+]</td>
<td></td>
</tr>
<tr>
<td>— active channel streaming, customer segmentation ~ [A+]</td>
<td>— new forms of automated processes, using ‘zero touch’ technologies (ZTTs) or radio-frequency identification ~ [A+]</td>
<td></td>
</tr>
<tr>
<td>— mandated channel reductions, ‘digital by default’ strategies ▲ [A+]</td>
<td>— isocratic administration, e.g. quasi-voluntary compliance, do-it-yourself forms ▲ [A+]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— moving towards open-book government ▲ [A+]</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second wave digital changes</th>
<th>‘100% online’ channel strategies [+A]</th>
<th>Social Web shifts to rich technology within online estate [A−]</th>
</tr>
</thead>
<tbody>
<tr>
<td>— ‘government cloud’ [A+]</td>
<td>— freeing public information for reuse, mash-ups etc. (open data initiatives) [A+]</td>
<td>— pervasive computing, fuelling transition to ZTTs and capital substitution for labour [A+]</td>
</tr>
<tr>
<td>— free storage, comprehensive data retention [A−]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>— government super-sites and enhanced search sites [A+]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

shows that most of the DEG1 components listed in this grouping are expanding rapidly. Radical disintermediation is attractive to officials looking for public spending cuts, as is the mandating of electronic channels—with in-person contacts in the UK public sector costing on average £9 each in 2009, phone transactions around £3.50, but online contacts under £0.40. As the UK government’s ‘digital champion’, Martha Lane Fox, put it shortly after the 2010 general election:

There are going to be huge cost cuts and digitalisation is an enormous piece in the puzzle. For refuseniks [i.e. citizens reluctant to interact with government online], there may just not be a choice … Government is not going to be able to ignore the enormous cost savings of communicating electronically with people. The Daily Telegraph (21 May 2010)

In addition, the development of ever cheaper ‘pervasive’ computing is fuelling a long-run push towards increased capital intensification in the public sector (think automatic river monitoring, traffic systems and pervasive radio-frequency identification chips instead of human staff) and a belated take-up of ‘zero touch’ applications long developed in large private sector services, which allow radical disintermediation of services.

Several governments have therefore responded to acute fiscal stresses by abandoning channel choice in favour of a ‘digital by default’ model of public service transactions and interactions, designed to cut administrative costs radically and move towards zero touch transactions. When policy-makers can assume that the vast majority of citizens have advanced Internet access, it becomes easier to mandate digital interaction (or to make it by far the cheapest or easiest option), or at least to mandate for key customer segments with universal access. It is necessary to achieve
around 80 per cent online users in order to realize the greatest economic benefits from digital transactions and information-seeking replacing phone, paper or in-person transactions. In Chile in the mid-2000s, mandating (combined with networks of Internet tax cafes) was used to achieve levels of online tax filing of almost 100 per cent. In the UK in 2009–2010, the tax agency (HMRC) introduced an element of mandating, which pushed online income tax self-assessment forms up from just over half of submissions the year before to 74 per cent, allowing HMRC to plan large-scale workforce cuts, and to project a shift to more than 90 per cent online transactions. Even in person-handling contexts, such as passport controls at airports, fully automated digital document scrutiny and identification functions are growing.

There is no agreement on the way to maximize other forms of government Web traffic, because information giving often cannot be mandated in equivalent ways to transactions. A radical (possibly foolhardy) experiment was the UK’s effort to concentrate all government–citizen interactions in a few, better-edited government supersites (such as the citizen-facing www.direct.gov), which guaranteed huge Google visibility but as critics forecast could not compete with search engines [58]—a successor gov.uk (https://www.gov.uk/) was launched at the end of 2012. The UK is also pioneering a ‘government cloud’ solution to next generation computing for all medium and small agencies, effectively trying to play catch-up for the previous lack of a government-wide enterprise architecture plan.

Decentralizing digital change components are also still growing despite the recession and austerity, since most e-services cut government transaction costs. Utility computing is spreading into government applications among small and medium agencies, albeit a little slowly because of government’s privacy and data security worries. And larger government organizations may use cloud solutions for non-recurring tasks [59]. More rapidly growing has been a push for isocratic (‘do-it-yourself’) administration, which still has a long way to run in public services. ‘Open book government’ (OBG) has greatly expanded from previous restrictive freedom of information regimes, where many requests for information were refused on commercial or policy-sensitivity grounds, and has already rocked many boats—for instance fuelling the scandal over the expenses of UK parliamentarians in 2009. Moves to free public information and data for universal reuse in mash-ups and other applications, as in the UK and US open data initiatives, have made clear headway. But they have had to struggle hard against the NPM stress on agencies recharging users for information in order to raise finances (often via privatization). OBG instead rests on a general expectation that all government information and large datasets across normal sectors will be online in accessible formats and capable of detailed scrutiny.

Governments’ digital responses to social media developments in commercial, social and cultural life have made slower progress, often in ‘catch-up’ mode. In a period when perhaps half of UK citizens are on Facebook, the UK government still struggles to get beyond text-based websites, to operationalize search within government sites, and to embrace social media [60,61]. Despite some hopeful statements of what ‘Web 2.0’ means for government [62,63], and the spread of rich media and social Web technologies into the public sector in Scandinavia, this development remains muted in bigger states, and is vulnerable to austerity pressures. For instance, most government networks and databases have been built for adequate capacity assuming text-only Web formats—adding in video, images, and social Web functionalities can easily trigger a need for substantially scaled new investments in networks and equipment, expensive even with falling IT prices. Although all OECD countries expound ‘digital economy’ strategies for fast broadband and increased skills development, the intra-government component has mostly attracted insufficient attention so far, outside of a few countries such as South Korea. The widening gulf in ‘look and feel’ for public websites compared with business best practice may lead to the increasing societal marginalization of the public sector online estate and declining government ‘nodality’ [64,65].

Some previous blocks to digital change are lifted by growing levels of Internet penetration, reducing the plausibility of ‘digital divide’ issues as a convincing excuse for not undertaking them. The end of the conventional digital divide has been fuelled by cheaper personal computers, broadband and the growth of Internet-capable phones and intermediate devices, which will be
pervasive in advanced industrial societies by 2015. Of course, smaller fragmented pockets of digitally disabled people will persist, among the elderly or ill, people who are less literate and the acutely poor. And new forms of market-based residualization will constantly crop up; for example, the joining-up of identification and financial payments systems may create new forms of disadvantage for people with poor credit histories and weak financial skills.

7. Conclusions

In the UK, a Conservative–Liberal Democrat coalition government elected in 2010 began a strong austerity drive by halting and reviewing all major IT contracts, squeezing IT suppliers for costs reductions, cutting back consultancy and instituting stringent requirements for the launching of any new government IT innovations. The days when the UK spent a quarter of all government IT spending across the EU area were apparently dead, consigned to a previous boom period under a Labour government. Yet, within 2 years of gaining office, the coalition launched perhaps the most ambitious civilian government IT scheme ever undertaken, as an inevitable corollary of seeking to create a ‘universal benefit’ in social security and to link that to ‘real-time’ tax information and tax credit payments.

Despite all the past problems of government ICT projects, which have been most acute in NPM countries [12], organizational and process innovations linked to and requiring digital changes remain absolutely central to any realistic effort to tackle the tendency for public sector relative prices to rise ineluctably over time. Private sector service industries have achieved huge reductions in costs that have in many cases fully offset the ‘Baumol effect’. The systematic study of organizational productivity growth in the government sector has only just begun to take off [46]. Yet, the past centrality of organizational changes linked to digital advances in determining whether administrative productivity grows or stagnates is already clear in this work.

Will this pattern of change continue into the future? The DEG₂ quasi-paradigm argued here leads us to expect continuing rapid, disruptive changes in information technologies to underpin a reorganization drive in the forefront counties to greater use of risk-based approaches, increased capital intensification in many parts of government, and the extensive use of social media and Web 2.0 applications. Within two decades the push for ‘inherently’ or ‘essentially’ digital processes within government [66] (with services and functions designed from the outset to be wholly digital in operation) may even begin to call into question some defining features of bureaucracy itself accepted since Weber’s times, a debate already live for private sector organizations [67]. This may seem very optimistic, however, and we recognize that there is a range of views. The conventional wisdom generally focuses on scepticism about the pace, feasibility and impacts of digital changes in government [68]. Some academic observers even seem to characterize all IT investments as NPM-based (instead of appreciating how far NPM inherently inhibits and clashes with digital change in practice), and to believe that somehow all government sector IT changes must necessarily end in crises and disappointment [28].

More immediately, we foresee three possible scenarios emerging for DEG in times of austerity (discussed in Dunleavy & Margetts [66]):

— a systematic revival of NPM approaches, and abandonment of or crisis for the DEG quasi-paradigm. So far, this seems to have been limited to short-lived spasms in the UK and elsewhere;
— an austerity squeeze beginning a ‘pause’ of DEG changes that perhaps opens up into an escalating ‘de-modernization’ or permanent lag in the organization of public services. This scenario remains a live one; and
— no more than a short-lived austerity pause in DEG developments, with long-run changes returning to trend, reflecting the need to continuously boost government productivity and curtail relative price increases, and to keep the administration of liberal democratic governments in close touch with digital-related changes in business and civil society.
We aimed to show here that there is reasonable evidence from advanced industrial countries that the DEG1 wave continues to develop, that a DEG2 wave is already giving additional impetus, and therefore to hope that this third scenario will materialize.

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