



# Digital technologies, artificial intelligence, and bureaucratic transformation

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## ABSTRACT

Bureaucracies are often criticized for their inflexibility, budget-maximizing wastefulness, and excessive rules and procedures. Rapid advances in technology, including the expansion of digital government, the use of artificial intelligence, and the ability to collect and analyze big data, promise to make public sector organizations leaner, more efficient, and more responsive to citizens' needs. While these technological changes have prompted some observers to forecast the end of bureaucracy, data from many countries show that bureaucratic public organizations are not disappearing. In this article, we argue that this paradox can be explained by revisiting some of the foundational work of sociologist Max Weber, who envisioned public administration itself as a bureaucratic machine. Advanced computing technologies, like artificial intelligence, are reinforcing bureaucratic tendencies in the public sector, not eliminating them. While advances in technology may transform the way public sector organizations operate, they can also serve to strengthen bureaucracy's core purpose.

## 1. Introduction

Rapid advances in digital and computing technologies have changed the operation of public administration in many countries. In areas like tax collection, criminal justice, and public health, sophisticated computerized data processing systems are becoming essential elements in the implementation of public policy and the delivery of public services. For example, advanced computerized data processing has been used in Brazil to control tax evasion (Faúndez-Ugaldé et al., 2020: 3), in the United States to provide guidance on whether to hold or release a defendant before a criminal trial is held (Rizer & Watney, 2018), and in Singapore to aid in contact tracing as part of the COVID-19 pandemic response (Goggin, 2020). These automated systems save time, reduce human capital costs, free up personnel to work on other tasks, curb biases and discrimination, and enable the consideration of problems too complex for human analysts. On the negative side, critics have argued that automation in public administration can pose ethical problems (Liaw et al., 2020), increase inequality (Eubanks, 2018), and generally reduce the quality of democratic governance (Young et al., 2019: 312). Some observers have commented that digital government will alienate citizens, leaving them "detached from the state" (Byrkjeflot et al., 2018: 1005).

Given these debates, as well as the rapid increase in sophistication and the declining costs of information-based technologies, now is the time to examine how advanced computing, automation, and artificial intelligence might transform the practice of public administration itself. One view is that, by doing away with the worst aspects of public sector administration, computing technologies

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will facilitate the "demise of bureaucracy" (Bennis, 1965: 34). More recently, others have argued that technology will facilitate a shift to a new form of flexible, responsive government operating in "a radically less complex institutional and policy landscape, engineered for simplicity" (Dunleavy et al., 2006: 489). How realistic are these predictions?

In exploring this question, we review some of the debates relating to the form and function of bureaucratic administration to show that obstruction and high costs are widely perceived to be core characteristics of public organizations. We then chart the impact of the "digital revolution" (Makridakis, 2017) on public administration and examine the progress of the upcoming artificial intelligence revolution to point out ways that technology might neutralize some of public administration's perceived deficiencies.

Nonetheless, data from around the world suggest that reports of bureaucracy's demise are likely exaggerated. To explain this paradox, we turn to the foundational work of sociologist Max Weber. Weber idealized the bureaucracy as a machine, where even human employees were merely cogs in the greater apparatus. Using Weber's understanding of public administration, we argue that advanced computing technologies, including artificial intelligence, could ultimately expand public administration's machine-like qualities and further enhance its bureaucratic nature. Advances in technology, therefore, might empower bureaucracy rather than eliminate it.

## 2. Bureaucracy

The negative connotations of the word *bureaucracy* are well known. Bureaucracies are criticized for their inflexibility, budget-maximizing wastefulness, excessive rules and procedures, lack of transparency and accountability, objectification of human needs, and deliberate obstruction of political decision making. References in media and popular culture depicting public bureaucracies (and their staff) as senseless and inane, such as the BBC's *Yes, Prime Minister* or the Australian TV series *Utopia*, are abundant. Political figures on all sides of the spectrum, from Ronald Reagan to Tony Blair to Joko Widodo, have made cutting red tape a part of their election campaigns. On public opinion surveys, the negative aspects of bureaucracy have frequently appeared as a major concern of citizens and representatives from the business sector, in a variety of jurisdictions (OECD, 2010: 34–36).

In academic debates, a wave of scholarly attacks on government, particularly from economists concerned about mismanagement and waste, materialized in the late 1960s and early 1970s. Most of these analyses equate government with bureaucracy. Niskanen (1975) for instance, argued that government bureaucracies aim to maximize, not minimize, their budgets. Tullock (1967) argued that when governments have monopolies on public service delivery, they tend to transform public services into revenue generating machines, to the detriment of the economy and society. Milton Friedman (2003) has written very simply that "we do not get our money's worth" from government spending or from "government mandates and regulation".

On the whole, these negative perspectives of government and bureaucracy are driven by an implicit argument that the public sector can *never* do things well, and should perhaps be replaced by something else. While persistent dissatisfaction with bureaucracy has inspired a lengthy history of administrative reform, extending back decades if not centuries, more recent changes have been the most radical. Supported by manifestos decrying "nonmarket failure" (Wolf, 1988), "government failure" (Le Grand, 1991), and the need for "reinventing government" (Osborne & Gaebler, 1992), politicians in many countries cumulatively drove a major restructuring of the public sector over the 1980s, 1990s, and 2000s to enable a greater reliance on private markets for financing and implementing service delivery (Newman, 2017).

Of course, not everyone holds these views. Many voices, including labor organizations, consumer protection agencies, environmental societies, and human rights groups, among others, continue to express confidence in the public sector, and frequently call for more government intervention in the economy and society. Government intervention, framed more benevolently as "collective action", is still seen by many as the best, or perhaps only way to overcome the problems of market failures such as the inability of the private sector to deliver public goods spontaneously (Alcock, 2016).

Academic defenders of government intervention also exist, and somewhat counterintuitively, they generally also take the position that governments are fundamentally bureaucratic. Kaufman (1977), for instance, argues that bureaucracy is a fundamental feature of public sector administration, that it is in fact created by the democratic process of decision making. Bozeman (1993: 293) argues that bureaucracy is necessary to prevent abuse of power in a democracy. Kettl (2008: 7) claims that ultimately, bureaucracy is the best way to organize the complexity of government, and that "society has yet to discover anything that works better".

At first glance, there appears to be a fairly dichotomous rift between those who see bureaucracy, or perhaps even government, as the problem, and those who see it as a solution. On the one hand, politicians and business leaders continue to advocate for reducing regulatory burdens, reforming public organizations, privatizing infrastructure, engaging the private sector in service delivery, dismantling labor unions, and other reforms aimed at removing administrative rules and procedures. On the other hand, dissenting voices continue to advocate for more public control over social programming and greater levels of public intervention to address policy problems. Understandably, the debate is often portrayed as being about whether government is inherently incompetent – slow, wasteful, inefficient, burdensome, and prone to growth-retarding taxes and regulations that are best described as "simply madness" (Cameron, 2012) – or competent, when government interventions, and especially regulatory regimes, are seen as effective measures that build up over time to advance society and keep people safe. Red tape, according to one commentator, "is the history of progress" (Toynbee, 2017).

Upon closer inspection, however, the debate is not as divisive as it might seem at first. Opponents of bureaucracy and supporters of government action agree on many of the factual characteristics of public sector administration. For instance, defenders of bureaucracy often acknowledge that government action is costlier than private sector activity. Wilson (1989: 318), for example, points out that government activity can certainly appear to be expensive by private business standards. But in reality, according to Wilson, these extra charges are the price of accountability, transparency, caution, and democratic deliberation. Governments sometimes spend money

unevenly, overspending on some sectors, services, locations, or policy areas and underspending on others, but Peters (2010: 210) argues that this is to ensure that public services are delivered fairly to all citizens. While unbalanced spending can be perceived as inefficient, according to Peters it is nonetheless a core responsibility of government to distribute services fairly. In other words, the responsibilities of a democratic government to its citizens create added costs that make public service delivery more expensive than private sector activities.

Another main criticism of bureaucracy is that it is obstructive. Politicians, especially, favor this argument. In 2014, British Prime Minister David Cameron said that one of his government's priorities was "getting out of the way of business" by scrapping thousands of regulatory rules, including some in areas such as poison control and food safety (Cameron, 2014). In his report on the National Performance Review reforms, US Vice President Al Gore claimed that bureaucratic procedures "consume managers' time and literally force them to waste money" (Gore, 1993: 2). Tony Abbott, prime minister of Australia, warned that public servants had an "accountability fetish" resulting in "bureaucratic overkill" (Abbott, 2014). Emmanuel Macron, president of France, has said that "regulation, laws, and taxes" create "a lot of complexity" that have weakened France's competitiveness and growth (2018).

But again, opposing voices do not actually disagree. Bozeman and Scott (1996: 4), for instance, assert that red tape is part of "a system designed to be redundant and, hence, inefficient in both structure and execution". Wilson (1989: 318) argues that government agencies are "slow" and "cumbersome". Writing about the United States, Moe (1989: 276) argues simply that "bureaucracy is not designed to be effective".

Ultimately, the debates about public sector waste and the obstructive function of public bureaucracies are not positive debates about what public organizations are, or what they can do, or even what they are good at doing – they are normative debates about what the public sector should do. Admittedly, promising to reduce red tape, as David Cameron did when he said his government would be the first to leave office with fewer regulations in place than at the time they were elected (Cameron, 2014), is a fruitful campaign strategy because it plays to the public's perceptions of a wasteful and pointless bureaucracy. However, underneath these campaign promises are ideological perspectives that governments should not regulate private industry because free market actors should not be obstructed by public administrators telling them to minimize safety hazards or reduce their carbon emissions. Opponents of government intervention believe that constraints on private business should be minimal, that managers in the public sector should not be bound by too many rules or procedures, and that democratically-accountable political officers and their appointees should be able to redirect public administrators as they see fit and without resistance. Conversely, those who support government intervention believe that checks and balances supplied by a politically-neutral, machine-like administrative apparatus provide an effective control against overzealous politicians, and enable fair and equitable delivery of public services to citizens. In short, despite the way that the debate is portrayed in popular culture and in political rhetoric, in reality the opposing sides agree on many of the facts: obstruction and expense are two core qualities of bureaucracy, in that public sector organizations are less responsive and more expensive than private firms would be in similar operations. The debate is more about the values that motivate the use of administrative government to achieve social goals, rather than the characteristics of bureaucracy, which are more or less accepted by most observers.

This debate has a renewed currency, now that computerized automation has begun to embed itself in the administration of the public sector and the delivery of public services. Advanced computing, including artificial intelligence, has the potential to eliminate many of the elements of public sector administration that are currently seen as wasteful or obstructive. The increasing adoption of artificial intelligence and other digital technologies throughout the public sector could result in a radical disruption of how the public sector operates, but, as will be elaborated below, this does not necessarily imply a fundamental change to the role that bureaucracy plays in modern democratic governance.

### 3. Digital technologies and bureaucratic transformation

According to some, the public sector has an obligation to explore new technologies, invest in research and development, and lead the creation of new industries (Mazzucato, 2016). Public administration, like administration in other sectors, has already been transformed by advances in information and computer technologies. These technologies have enabled a number of major changes in how public bureaucracies operate:

#### 3.1. Speed in internal operations

Record-keeping is an essential element of bureaucracy (Brookes & Dunk, 2018). The ability to access, update, and cross-reference data quickly has transformed the practice of public administration by increasing the speed of virtually all administrative activities. Regulators, tax compliance officers, police detectives, epidemiologists, and government lawyers all have much greater, and quicker, access to the information they need to do their jobs than they ever had before. It may seem trivial to remark that public servants no longer have to store paper documents in filing cabinets, but it was not so long ago that public agencies had to maintain large storage facilities for such documents, and significant human resources were required every time some of this information needed to be accessed.

#### 3.2. Convenience at the user interface

In many countries around the world, government services are increasingly moving to electronic formats wherever possible, a practice that has sometimes been referred to as "e-government" (Manoharan, 2012). Attendance at a physical office location is no longer necessary for a wide variety of services, including visas and immigration, passport applications, birth certificates, business

registrations, accessing subsidies and benefits, applying for building permits, and many others. Paper-and-ink forms are disappearing. Citizens can now register for and access services from home, on their personal computers or mobile phones. High-resolution cameras embedded in most mobile phones have made expensive scanning and printing equipment unnecessary; identification documents can be photographed by a phone or a computer and uploaded directly with only a few taps or clicks. In most jurisdictions, technical support is available by telephone to assist users who encounter problems.

Filling out Byzantine paperwork and having to attend a government office to make an application or to resolve a problem are traditionally seen by citizen end-users as being among the most vexing aspects of public bureaucracies (Moynihan & Herd, 2010; Nisar & Masood, 2020: 885). Electronic government services have begun to alleviate the distress associated with these experiences, by making the public's interaction with government agencies dramatically quicker and more convenient.

### 3.3. Better data

Advances in technology have allowed government agencies to collect information relevant to policy making at an unprecedented level of quantity and detail. Technologies like global positioning and satellite imagery are important in a variety of policy areas, providing policy makers with information they need to make decisions related to defense, security, and the environment. But more importantly, the rapid expansion of direct-contact mobile phone and personal computer applications means that government agencies can collect vital information directly from citizens in real time. Policy makers now have direct access to reliable data about their citizens that will enable more targeted, more effective, and more responsive decision making for service delivery than was ever possible before.

Improvements to data collection operate at a variety of different scales. On a small scale, citizen "snitch lines" allow individuals to report crimes, vandalism, food safety breaches, environmental offenses like illegal dumping of garbage, and a wide variety of other perceived violations of law and regulation all the way up to undocumented migration (Walsh, 2014). While some commentators argue that these reporting mechanisms sow discord and are anti-community (e.g. Mykhalovskiy et al., 2020) or unfairly target the poor and disadvantaged (Raffass, 2014: 9), the model itself is based on the anonymous Crime Stoppers tip line which by some accounts has been highly successful (Challinger, 2003).

On a larger scale, governments can collect policy-relevant information about large groups of people by aggregating data collected directly from individuals. During the COVID-19 pandemic response in 2020, for instance, Singapore's Trace Together mobile phone application tracked contact between individuals and created an alert when users were in close proximity to an infected person (Goggin, 2020). In 2008, the city of Venice, Italy, launched a digital portal through which citizens could report public works problems, from potholes to pest infestations (Cordella & Tempini, 2015). In some jurisdictions, environmental conservation policies are increasingly informed by "citizen science", such as mobile phone applications that allow users to record sightings of plants and animals (Conrad & Hilchey, 2011).

### 3.4. Transparency

It has never been easier for governments to present information, of all kinds, to the public. During the COVID-19 pandemic, Daniel Andrews, the premier of the Australian state of Victoria, held daily live press conferences for more than 100 consecutive days, in which he provided a status report on the pandemic situation, gave an update on the state government's policy response and evolving regime of restrictions on employment and mobility, and answered a long list of questions from reporters (Graham et al., 2021: 2). In addition to the premier, the state minister of health and a representative from the state's Department of Health (such as the Chief Health Officer) regularly appeared at these briefings and spoke to the public. Not only were these press conferences broadcast on free-to-air television, they were also available for online streaming direct to a computer or internet-capable mobile phone.

In an information-rich environment, there are numerous channels that political and administrative actors can use to reach public audiences. Traditional media, like television, print, and radio are still available, but these are supplemented by more direct avenues like text messaging, live-streaming, and mobile phone notifications. In particular, the pervasive use of social media amplifies the effect of word-of-mouth, as people can share information instantly and widely, and users can receive instant message notifications when one of their social media contacts posts something to share. Of course, the challenge then becomes one of ensuring that the public receives the correct information, and not incorrect "misinformation" or deliberate and malicious "disinformation" (Guess & Lyons, 2020).

### 3.5. Accountability

Technological improvements to official recordkeeping have already significantly raised the standard to which public officials are held to account. Video cameras in courts, legislatures, commissions of inquiry, and on the uniforms of soldiers and police officers keep track of public proceedings and activities, and allow for easy verification of the official record. Freedom of Information requests no longer require a staff member to get up on a ladder and search through boxes of old paperwork; documents and recordings are filed in electronic databases and can be searched and accessed within minutes from any location.

While the above discussion presents technologies that are already in use, this digital revolution is not yet over. Continuing advances in data storage and processing promise to accelerate these changes. For instance, even in advanced democracies, some public agencies rely on aging legacy computing systems that are in dire need of updating (Pang, 2017). If these systems were improved, streamlined, and integrated, government agencies would be able to communicate better with each other and share data, which would make internal bureaucratic processes even faster than they are now (Yang et al., 2014). As data collection and retention technologies progress, and

the sharing of data between government departments improves, interactions between citizens and governments could become increasingly personalized, with forms arriving pre-filled and less time and effort required on the part of the user. Likewise, access to user data and sharing between agencies would enable the creation of one-stop shops, where multiple services are coordinated by single offices and duplication of services (such as call-center services, or the development of websites and electronic forms) is eliminated (Blackburn, 2016).

#### 4. The arrival of artificial intelligence

More – and perhaps bigger – changes are now on the horizon. According to Makridakis (2017), the "digital" revolution brought about by wireless communications and the internet is now about to be superseded by the artificial intelligence revolution, in which computers with advanced decision making capabilities threaten to make many human tasks unnecessary.

The term "artificial intelligence" does not have a specific definition. It is, rather, a loose description of various computer operations designed to replicate human intelligence (Kaplan, 2016). Artificial intelligence usually refers to computer programs and systems that mimic human decision making, learn new rules and decision pathways based on previous experience, use matching algorithms to make educated guesses, and generally operate relatively independently of human direction. It is a component of a greater set of computing technologies that includes automated decision making, advanced algorithms, and data processing at large scale. With this in mind, there are several ways in which the next revolution could transform public administration:

##### 4.1. Automation

It is increasingly easier for computers to do what human public servants used to do. A good example is automatic notification: if there is a problem with local water quality, or if emergency public works result in the closing of residential streets, or if a debt is overdue, a computer program can identify individual citizens who are affected by the issue and then these individuals can get a personalized text message sent directly to their mobile phone notifying them of the issue and how to manage it. Within minutes, automatic notices can reach thousands of people, whereas a human effort to accomplish the same goal would take hundreds of hours of staff time and would in any case likely arrive too late to be of any use.

The potential for further automation in the public sector is vast. Automation has already enabled electronic income tax filing, rapid payment of welfare benefits and other government subsidies by direct bank deposit, the enforcement of speed limits on roads with digital camera technology, monitoring of criminal offenders under house arrest using global positioning systems, and driverless public transport vehicles, among many others. In the very near future, one might imagine a fully computerized national census, delivery of mail by autonomous flying drones, car registration and insurance fees indexed to real-time data on individual annual driving patterns, automated supply chain management of health care resources, and many others. All of these applications minimize costs by accomplishing large quantities of work in significantly less time than human workers might require for the same task.

##### 4.2. Formalization

One key responsibility of the public sector in a democracy is to support a fair and equitable distribution of public services to citizens. According to Walsh and Dewar (1987: 220), this is accomplished in part through bureaucratic rules and procedures, which minimize human error and bias and ensure that all citizens are subject to the same consistent and predictable conditions for access to services. Walsh and Dewar refer to this practice as "formalization". Jurisdictions in which rules and procedures are not formalized often experience systemic corruption, as in the case of police officers soliciting bribes from road users in Nigeria (Mele & Bello, 2007), or public procurement officers fixing contracts with favored providers in exchange for "kickback" payments in India (Davis, 2004).

Technology can assist in formalization by systematizing complicated or multi-step decision making processes. Computer algorithms, for instance, can make decisions more consistent and reliable. The equitability of this depends, of course, on how the algorithm is programmed, and so it is limited to the ethical awareness of the humans who write the programs.

##### 4.3. Complex analysis

Computers allow for the simultaneous consideration of multiple variables in a way that human minds cannot accomplish. This depth of analysis can provide more precise, more accurate, and generally better informed policy decisions. Computer-aided analysis is already used extensively in public health modelling (Metcalfe et al., 2015), disaster response (Hristidis et al., 2010), and public transport planning (Briand et al., 2017), but there are many further areas – such as housing, education, waste management, natural resource management, and so on – where computers could help decision makers address complex policy problems.

##### 4.4. Big data

In addition to depth, computers can also enable a wider breadth of information for analysis. The opportunity to examine data involving millions or even billions of data points would enable improved policy strategizing and forward planning. Notable examples of big data analytics include fire prevention in the United States and health care planning in the United Kingdom (Giest, 2017), but, as data storage and processing capabilities advance, further applications could emerge in policy areas such as employment, welfare, education, energy use, and domestic and international migration.

Artificial intelligence could represent a step change in the way that technology is used to enhance public sector performance. Automated operations, independent decision making, complex analysis, and bigger and better data collection could all further propel the advances that have been seen throughout the digital revolution of the past twenty years.

## 5. The "demise of bureaucracy"

Earlier, we argued that many observers, speaking from opposing values positions, agree that public bureaucracies are uneconomical and unwieldy. Detractors insist that these qualities are pathologies that should be rectified, mainly by replacing bureaucracies with private actors who they believe are more efficient and more responsive than public agencies can ever be. Defenders claim that what might appear to be pathologies are actually desirable features that allow democratic governments to deliver services predictably and equitably. In either case, the assertion is that public sector agencies are slow, obstructive, expensive, and can appear inefficient or even wasteful.

However, massive advances in technology promise to radically transform the way public agencies operate, by increasing the speed of their actions, boosting internal and external communication, improving transparency and accountability, and dramatically increasing the quality of information used to develop policies, procedures, and services. Many of these advances have already been deployed and transformation in the public sector is already evident. Going forward, information-based technologies, and especially advanced computer analysis and autonomous decision making, threaten to lessen or even eliminate some of the core characteristics of public bureaucracy. How might the adoption of these technologies affect democratic governance?

In 1965, around the time that Marshall McLuhan first wrote about the dawn of the information age, organizational management guru Warren Bennis published an article in which he "forecasted" that advances in technology and an emphasis on productivity would soon spell the end of the public bureaucracy (Bennis, 1965). Many of the article's predictions have already come true: Bennis believed that technology would facilitate significant industrial concentration, as well as a substantial rise in the scale of enterprise, to the effect that the government and a small number of massive private companies would dominate in many industries. Certainly this has already happened in retail (e.g. Amazon, Walmart), personal computing (e.g. Microsoft, Apple, and Google), and supermarkets (e.g. Tesco, Carrefour). Bennis also predicted a more educated and flexible workforce, resulting in a weakening of employee loyalty, and a shift to short term, concentrated problem solving and temporary contract-style jobs – something that has been observed in recent years under the moniker "projectification" (Jensen et al., 2016). In terms of employment, Bennis argued that technological advances would put an end to rank-and-file bureaucratic jobs, because the work that these jobs entail could be performed more easily and more economically by computers. Since 1965, some public sector jobs, such as human toll collectors on highways, have very obviously disappeared (Borri & Getha-Taylor, 2019). And lastly, Bennis suggested that public sector tasks (for example, collecting and analyzing large streams of data) and goals (for example, improving education) will become too complex for individual humans, and will demand further advances in technology as well as extensive cooperation among highly-educated specialists working across agencies. Half-a-century later, more recent authors have echoed these exact same claims (e.g. Christensen & Laegreid, 2011).

However, Bennis' overall argument that bureaucracy will become "less and less effective" and "hopelessly out of joint with contemporary realities" (1965: 31) has not materialized. The artificial intelligence revolution may only be beginning, but the digital revolution is now into its fourth or fifth decade, so at this point it is definitely possible to discern the impact of technology on public administration and to assess whether or not bureaucracy is experiencing its demise. On inspection, despite the persuasiveness of Bennis' argument, and the accuracy of his other related predictions, bureaucracy does not appear to be experiencing its death throes. On the contrary, as measured by a variety of metrics, bureaucracy is thriving - and this is especially so in jurisdictions that have been most successful in implementing e-government and other digital technologies (Drechsler, 2020: 3).

In terms of gross employment, while there has been some variation from one country to another, on the whole the public sector has certainly not collapsed in most advanced democracies. In fact, between 2000 and 2017, the period in which information technology and advanced computing has arguably had its biggest impact, employment in the public sector across the Organisation for Economic Cooperation and Development (OECD) as a percentage of national employment remained remarkably stable. This is true for the time period as a whole, during which the average level of employment actually rose from about 15 % of national labor in the year 2000 to 18 % in 2015 (OECD, 2011: 103; OECD, 2019: 85),<sup>1</sup> as well as over shorter intervals such as the ten years between 2001 and 2011 (OECD, 2013: 103) or the four years between 2009 and 2013 (OECD, 2015: 85). Advances in technology ought to make human personnel redundant, and yet public sector employment has steadily risen throughout the time period of the digital revolution.

Other OECD data also support the interpretation that the public sector in developed democracies has not significantly declined, despite dramatic advances in disruptive computing technologies. For instance, governments have maintained consistent levels of spending. Between the years 2000 and 2018, average general government expenditures as a percentage of gross domestic product across the OECD declined only marginally from 41.9 % to 40.4 % (OECD, 2011: 65; OECD, 2019: 69). In fact, when measured per capita and in terms of purchasing power parity, government spending actually appears to have increased. This rise in per capita public sector spending is apparent both over the whole period, and also over shorter timeframes, such as the years 2007–2017 (OECD, 2019: 68). Technology should make governments and their bureaucratic organizations more efficient, in which case they should be saving money. And yet public spending is on the rise.

Public perceptions of bureaucracy have also remained stable over time. Between 2007 and 2018, for instance, average public

<sup>1</sup> Although it should be noted that at least part of this rise is attributed to a change in methodology. The 2000 numbers are calculated as a percentage of the labor force, which includes the unemployed, whereas the 2017 numbers are presented as a percentage of the employed only.

satisfaction with education, health care, and justice systems across the OECD member countries remained virtually unchanged (OECD, 2019: 179). In Germany, public opinion polls asking about how much respondents "trust" the public administration returned highly consistent results over the years 1984–2008 (Rölle, 2017: 248). And these country-specific results are reflected across the globe: using data from the World Values Survey from 1994 to 2014, Sanabria-Pulido and Bello-Gómez (2021: 10) found that confidence in the public service was relatively stable over time in countries around the world (but that the overall sentiment was negative, in that "a majority of citizens do not trust their public servants").

And lastly, scholarly studies on red tape and bureaucracy provide evidence of its continued existence. Using interviews and a survey of public servants in the Netherlands, van Loon et al. (2016: 670) reach the conclusion that red tape continues to exist and that under the right conditions it can present a material burden to public sector employees. Another study, on public servants at the local government level in the United States, found that when asked whether red tape was high or low in their department, responses were skewed "somewhat toward the 'high red tape' end of the spectrum" (Kaufmann et al., 2019: 239). In general, scholarly interest in the subject is evident: across the top quartile of academic journals in the field of public administration, as ranked by the Scopus database, we found at least 31 peer-reviewed articles published between 2016 and 2020 with the words "red tape" in their title.

In summary, despite major technological advances that could alleviate many negative aspects of the public sector – such as waste, inefficiency, and obstruction – bureaucracy persists. We turn now to some of the foundational thinking of public bureaucracy in order to explain this paradox.

## 6. The bureaucratic machine

Max Weber, in his pioneering work on public sector administration, described the bureaucracy as a machine – a faceless, impersonal, autonomous apparatus, set apart from the drama and emotion (and charisma) of the political arena (Anter, 2014: 200–201). Human administrators, especially at the individual level, do not control the bureaucratic machine from within. They are workers dedicated to its smooth operation. To Weber, a public servant "is only a single cog in an ever-moving mechanism... The individual bureaucrat is thus forged to the community of all the functionaries who are integrated into the mechanism" (Weber, 2009a [1921]: 228).

According to Weber, the ideal bureaucracy – ideal in the sense of "pure", not in the sense of "desirable" (Weiss, 1983) – is one that operates independently of the action and personality dynamics characteristic of politicians, parliaments, and political parties (Weber, 1994a [1918]: 178; Weber, 2009b [1919]: 95). Four fundamental principles ensure that bureaucratic organizations operate this way:

### 6.1. Power is vested in the office, not the individual

In an ideal bureaucracy, authority is distributed, delegated, clearly delimited, and hierarchical, with no individual wielding any special power beyond what is formally delineated by their role. Human personalities, interpersonal dynamics, and inherited legacies confer no special powers on an individual officeholder, and authority does not extend to the individual when acting in a personal capacity or when their time in office is at an end. Officeholders can be replaced (and must be, when the office continues to be required). Private lives and property of officeholders are of no relation or relevance to the office. Offices discharge their duties objectively, according to rules, and "without regard for persons" (Weber, 2009a [1921]: 215).

### 6.2. Meritocracy, not patronage

According to Weber, bureaucracies are highly technical organizations. Officeholders require specialized training, and must be otherwise qualified with appropriate levels and specialization in education, experience, and skills (Weber, 1994a [1918]: 156). Essentially, bureaucratic officeholders are experts in their field. They are consummate professionals, working full-time in their roles and to the best of their abilities. Moreover, they are appointed on the basis of their skills, qualifications, and appropriateness for the role. They are not appointed as a reward for support of a political figure, and they are not elected (Weber, 2009a [1921]: 198–201).

### 6.3. Loyalty to the service (and only to the service)

In Weber's bureaucracy, individual workers are essential components of a smoothly-operating mechanism, but they must work to the benefit of the system and not in their own personal interests (Weber, 2009b [1919]: 95). Officeholders do not exploit their authority for monetary gain. Bureaucrats are allowed – indeed, encouraged – to benefit themselves personally through promotion and personal career development, but in effect these are rewards for working to maximize benefit to the office or to the system as a whole. These opportunities for career progression and meaningful increases in salary are vital incentives for workers to remain loyal to the organization. To the same end, bureaucrats must receive a stable, prescribed salary, with generous benefits such as guaranteed pensions and automatic raises in pay (Weber, 2009a [1921]: 203–204).

### 6.4. Offices are stable and are insulated from political interference

Weber argues that in an ideal bureaucracy, public organizations should not be subject to interference from political forces. Officeholders are beholden to the organization and to the public service, but not to the political leader of the day (Weber, 2009a [1921]: 199).

Weber recommends a few strategies to protect public bureaucracies from political interference. First, officeholders must have tenure. In other words, they should have "legal guarantees against arbitrary dismissal or transfer" (Weber, 2009a [1921]: 202). Secondly, offices must be governed by prescribed budgets, which stops political leaders from personally enriching themselves with public funds, makes rent-seeking unnecessary, and enables strategizing and forward planning within the office. And thirdly, the bureaucracy should usually be opaque to the public and to elected officials (Weber, 2009a [1921]: 234). Bureaucracies can be held accountable through internal procedures for oversight, and in a functioning democracy legislatures should have the power to subpoena senior administrators and demand information (Weber, 1994a [1918]: 178–180), but in general bureaucracies must not be subject to overzealous scrutiny or micro-management from external actors.

Weber attributed several benefits to the conceptualization of bureaucracy outlined above. First, the outputs of such a bureaucracy are going to be predictable. With rules and procedures governing all aspects of operation, with political interference kept at a minimum, and with some protection against the caprice of human personalities, bureaucracies can produce stable, predictable, and scheduled outputs. Predictability of public services makes planning other aspects of life and society, including crisis response, easier. Moreover, the same mechanisms that make Weber's bureaucracy predictable also ensure continuity. It is unfazed by changes in political executive, and is even resistant to revolution (Weber, 2009a [1921]: 230).

Secondly, Weber's bureaucracy ensures fairness, justice, and adherence to the rule of law. Public resources and services are distributed equitably, according to rules and formal procedures. They are not handed out with priority to cronies, privileged elites, wealthy individuals paying to jump queues, or to those with powerful political connections. Furthermore, a neutral public administrative apparatus governed by rules and procedures will also protect the public against corruption, which inevitably leads to a waste of public funds.

And finally, Weber's ideal bureaucracy provides general support for rationality and instrumentalism in public policy decision making. Weber's bureaucrats are technical experts operating a machine. They follow rules. They obey a hierarchy. In this ideal conception of the public sector, public servants must view policy matters as technical problems that can be puzzled through and solved. This is not to imply that all problems are easily solved or that the bureaucratic machine is always capable of solving them. Weber's argument here is that using a technical public sector policy machine, rather than, say, a political executive or other elected council, will lean policy more towards rational decision-making and away from political expediency, traditional or religious dogma, and intentional conflict.

Taken together, the qualities that Weber ascribes to bureaucracies in the ideal help to explain why improved technology does not necessarily pose a threat to the existence or function of public administration. On the contrary, the varieties of advanced computing, digital automation, and artificial intelligence that are increasingly being deployed throughout public sector administrative organizations should actually serve to strengthen and enhance bureaucratic administration.

Weber's ideal bureaucracy accomplishes two things. First, it separates the functions of public administration and service delivery from the unpredictability of the political arena and the whimsy of human personalities and political forces. In the ideal, bureaucracies separate administration from politics, in order to mechanize government intervention.

Secondly, the skillsets, advanced education, and technical competence of administrators in the ideal bureaucracy give administrators control of the means to implement policy, especially the collection and processing of information. According to Weber, "the power of all officials rests on *knowledge*" (Weber, 1994a [1918]: 178, emphasis in original).

Earlier, we described five ways that the digital revolution has already transformed public administration: speed in internal operations, convenience at the user interface, better data, transparency, and accountability. All of these are related to an increased mastery over information, which is not surprising given the emphasis on this word in describing the changes taking place during that time, for instance in phrases like "information technology", "information superhighway", and "information revolution" (Makridakis, 1995).

The next stage of technological development, which includes artificial intelligence and other advanced computing technologies, could support bureaucracies to achieve an even greater authority over information, through complex analysis and use of big data. In addition, and perhaps more importantly, these advances would also enable a deeper mechanization of public administration, through increased automation and formalization. And these phenomena work in combination: Improved technology in public sector applications would result in an increase in the standards for skills, training, and experience required for public service jobs, so it would be even harder for unskilled politicians and members of the general public to interfere with administrative operations.

In other words, more computing power, more intelligent programming, and more advanced automation could effectively enhance a bureaucratic organization's existing Weberian qualities by making them stronger and more efficient. Rather than eliminating bureaucracy, recent and imminent technological advances are giving bureaucracies better tools to do the job that these organizations were essentially designed to do. These technological advances are not replacement technologies, they are upgrades to existing systems.

## 7. Conclusion: what might we expect from the future?

Computer-based technologies, especially artificial intelligence systems, are developing at a rapid pace. Many of these technologies are already becoming essential components in the delivery of public services around the world. Naturally, there is some trepidation about how these technologies will affect the administrative nature of the public service. However, improved sophistication and increased capacity of computing power should serve to enhance the Weberian characteristics of the public sector, rather than resulting in the demise of bureaucracy. Admittedly, here we have taken a mainly Western-centric perspective, and it should be noted that Weber also wrote extensively about China and India and other non-Western traditions (e.g. Weber, 1994a [1918]: 156–159).

Two divergent scenarios are possible. Digital technologies, managed appropriately by human programmers, could support the



neutrality, fairness, and accountability of the public sector. These technologies contribute to an increase in the formalization of rules and procedures, which could lead to fairer delivery of services and a reduction in practices that result in inequitable outcomes, like systemic corruption or legitimized queue-jumping for services. In this scenario, entrenched discrimination would be handled more easily. Addressing gaps in service delivery, uneven distribution of resources or outcomes, and flaws in crisis management and prevention would be facilitated by sophisticated computer models, real-time data collection, analysis of big datasets, and artificially intelligent systems that can suggest connections and correlations that would otherwise evade human perception. In short, advanced computing technologies could not only strengthen the ability of public sector organizations to deliver services to the public, they could also enhance the inherent democratic nature of bureaucracy and further concretize its role in democratic governance.

However, an alternate scenario is equally plausible. As mentioned earlier, there are many observers who caution that increased automation could result in a sort of technocracy, where rules and machines govern society and changes to the system are difficult to initiate or implement. Weber also warned about this danger, writing abundantly about bureaucracy's tendency toward subordination, domination, and authoritarianism (Weber, 1994a [1918]: 146–147; 1994b [1917]: 129; 2009b [1919]: 80). A truly machine-like administrative apparatus could threaten to undermine democracy entirely.

There are ways to promote the first scenario while curtailing the second. Weber, for instance, argues that legislatures are the key to keeping the bureaucracy in check. According to Weber, the bureaucracy is subject to control "from the very top" (2009a [1921]: 228). Bureaucracies in a democracy are hierarchical organizations, and their ultimate leaders are political appointees beholden to a democratically-elected legislature and executive (Weber, 2009b [1919]: 80). Although reform is difficult and bureaucratic institutions are stubbornly resistant to change (see Castellani, 2018 for example), they are not completely independent, and politicians operating within democratically-elected legislatures constitute the best way to ensure that bureaucratic technocracy does not arise (Weber, 1994a [1918]: 178–180; 1994b [1917]: 126–129). Support for active and legitimate legislatures, effective political executives, and free and fair elections will, according to Weber, assist in curbing the power of a technocratic administration.

Modern analyses suggest further that public administration is undergoing a paradigm shift from a traditionally hierarchical form of bureaucracy to one that is more flexible, citizen-centered, and oriented toward outputs. This has been variously referred to as the New Public Service (Denhardt & Denhardt, 2000) or the Neo-Weberian State (Byrkjeflot et al., 2018; Pollitt & Bouckaert, 2011). A parallel literature claims that technology will enhance this shift to a citizen-centered administration, bringing into play what some have called "digital-era governance" (Dunleavy et al. 2006). Proponents of both the Neo-Weberian State and digital-era governance argue that as public administration evolves and technology becomes more entrenched, bureaucracy will move away from Weber's ideal characteristics. However, there are many observers who assert that the Weberian ideal-type remains at the heart of public administration, even in the face of – or perhaps further highlighted by – advances in technology (Bartels, 2009; Drechsler, 2020; Drechsler & Kattel, 2020).

Bureaucracy is not being abolished, or even diminished, by modern advances in technology. On the contrary, technology appears to be bolstering bureaucracy's fundamental qualities. Looking forward, rather than fearing the coming artificial intelligence revolution, public agencies should embrace advanced computing and look for ways for it to further public service objectives.

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