

THEME 02

# The codification of public policy

GOVERNANCE

TECHNOLOGICAL INNOVATION

CODE IS LAW

Whether it concerns tax returns, car parking or public participation, governments are increasingly making use of software to develop and execute public policy. As a consequence, laws and regulations need to be molded in software and the process of policy-making will start to look more and more like writing code. However, code and (traditional) law are, partly, at odds with each other and it is questionable to what extent code can replace laws written in natural language. Similarly, the question is to what extent automated systems can replace current judicial processes.

## Our observations

- Most forms of computing and coding started as an answer to the administrative or military needs of governments. One of the original companies that later came to form IBM, the Tabulating Machine Company, started its business making punch card systems for the U.S. government's census, the first computers were developed for military purposes and so was the forerunner of the internet, the ARPANET.
- Not seldom do public IT projects end up costing too much while performing poorly at best. This was true for the British attempt to build an electronic [patient record](#) system and, more recently, it became clear that the Dutch [tax system](#) suffers from a patchwork of hardly-compatible and outdated applications. The same is true for electronic [voting](#), which remains a challenge to organize in a secure and reliable manner. Despite these eye-catching failures, most (Western) governments have succeeded in offering basic digital interfaces for, for instance, tax returns and other financial matters and to communicate policy proposals and invite citizens to participate.
- As an example of public participation in the policy-making process, Dutch citizens (including businesses and special interest groups) are invited to respond to [policy proposals](#) through a website. While the current system does not (pretend to) exclude backroom lobbying, future developments could require all policy development processes to take place online and be open to the public.
- [Publiccode.net](#) is a recent initiative to build open-source software for public entities to help them automate their processes and allow other cities or nations to use the same (or tailored) software and support each other with improvements and updates.
- Not all digital systems automatically introduce transparency and this is especially true when they are developed by private entities. In the Netherlands, a [modelling tool](#) was used to assess the impact of financial incentives on the adoption of electric vehicles. The (private) developer of the tool was, however, not willing to have his model audited and policy-makers were thus never fully aware of the underpinnings of the policies they approved.
- We recently noted how it is impossible to exclude all forms of [bias](#) from code (e.g. algorithms), simply because human language is intrinsically ambiguous and sometimes contradictory. That is, when "translating" natural language into code, arbitrary choices need to be made and bias is introduced. Hence, in some cases algorithmic decision-making may be more accurate, just or efficient than human decision-making, but in many cases code cannot grasp the complexities of reality and "fairness".
- The Ethereum blockchain is a platform for smart contracts that automatically enforces agreements between multiple stakeholders (i.e. where "code is law"). A coding mistake in one specific contract (the [DAO](#)) allowed a hacker to (conditionally) extract \$50m from that agreement, leaving his victims no other choice than to re-boot the entire Ethereum system in order to regain control over their funds (and de facto changing the "law" [after the crime was committed](#)).

>> see next page



## Connecting the dots

The codification of public policy presents many benefits for governments and citizens as it allows for processes to be made more efficient and transparent and, ultimately, more just and democratic. It also comes with challenges and to a large extent, these are not too different from those faced by businesses or other organizations. Software is expensive to build (or tailor to one's needs) and actually implementing technology comes with many unforeseen hurdles as adjacent processes (and people) need to adjust to the new system. And, possibly one of the biggest challenges when software is developed specifically for a single organization is that it has proven difficult to keep the application up-to-date and to incorporate new features without ending up with a messy and poorly working patchwork.

In the longer term, however, the challenge will become more fundamental. As regulations are increasingly finding their way into code, the question is whether code can ever be a substitute for laws written in natural language and what role automated systems can, and should, play in the execution and enforcement of regulations. To start with the first, [Lawrence Lessig](#), the Harvard law professor who coined the phrase “code is law”, is quite clear on this matter: as it stands, code cannot fully replace traditional law as it does not allow for the kind of deliberate ambiguity that is typical of today's legislation. There is, for instance, an inherent tension between the right to free speech and laws against discrimination, defamation or insult. For a code-based system such ambiguity would be impossible to deal with and this “bug” would have the system crash. In the current judicial system, ambiguity is a feature, not a bug, as it acknowledges that it is practically impossible (and certainly inefficient) to write laws so elaborate that they cover (unambiguously) every conceivable dispute; it is better to leave these kinds of decisions up to court. In a similar vein, in some cases courts have to deviate from the “letter of the law” in order

to prevent “unjust” outcomes or protect greater societal interests. As the example of the Ethereum-based DOA has shown, a tiny mistake in a piece of software (i.e. codified law) can lead to undesirable outcomes when there is no room left for common sense or an appreciation of the spirit of the law (similar dynamics appear with the [VAR](#) system in football). In the future, [machine learning](#) may allow for more complex and context-dependent decision making (e.g. on the basis of automated analysis of jurisprudence), but it is unlikely that such a system could deal with all conceivable cases.

On the execution side, the future is likely to bring many more code-based applications that directly enforce policy on the basis of (increasingly automated) input. To illustrate, (some) speeding tickets are already produced by fully automated systems that measure a vehicle's velocity, record its license plate and calculate a fine. In the future, similar systems may be allowed to revoke someone's driver's license or to remotely disable one's car. Effectively, such systems would entail smart contracts between citizens and the state with varying legal capacities. These may, or may not, run on a (private or public) blockchain to make sure that every citizen is treated the same and no records or rules can be tweaked in favor of individuals or special interests. Such rigidity would, however, come at the expense of the kind of fairness and common sense that is still part of today's judicial system. It will thus be very much a challenge to increase efficiency and transparency without ending up with a “[Judge Dredd](#)”-like scenario that disregards the fundamental limitations of code-based rule-systems. Because of this, the smart social contract of the future will always have to contain meaningful possibilities to appeal a decision or for humans to intervene somewhere in the process, without re-opening the door to bureaucratic friction or legal inequality.

## Implications

- The codification of policy will increasingly rely on automated forms of input from all sorts of so-called oracles (e.g. sensors). As more weight is placed on their output, such devices will need some kind of legal approval (cf. current legal struggles over speedometers) similar to medical equipment today. The ability to gain such approval could become a decisive factor for the success of producers.
- As we noted earlier, there will be a shift from regulations that tell us what to do (with penalties for disregarding the rules) to devices in which those regulations are inscribed and which simply [refuse to act illegally](#) (cf. geo-fencing for drones). As a consequence, the manufacturers of these devices will become integral to the law enforcement “value chain”.
- Electronic voting has not been successful yet, but in the (distant) future we may see democracy shifting away from a representative system to one in which voters are a node in a decentralized system that decides directly on (codified) proposals for new or adjusted laws. In such a system, we would no longer vote for politicians or policies (as in today's referenda) but for, or against, lines of code.