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## THE INTERNET OF THINGS AND PUBLIC ADMINISTRATION Heading for an automated Smart Government?

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*This paper examines the impact of the so-called Internet of Things in public administration. First the concept of the Internet of Things is explained (ad I.) and application examples from the administration help to clarify what this concept is about (ad II). These examples also show the opportunities and risks of the Internet of Things for the Administration (ad III). They play a legal role insofar as administrative and constitutional norms can impose motivations to introduce applications of the Internet of Things in the public administration as well as mandate concrete designs and create limitations (ad IV.). From the results of legal analyses, these are formulated based on the question of the potential of the Internet of Things to change administration and administrative law (ad V.).*

In the last few years, few concepts stimulated the imagination as much as the Internet of Things (IoT). Whether it was a self-refilling refrigerator, an autonomous car, or increasingly automated industrial equipment, there was no shortage of new products and new ideas.<sup>1</sup> The Internet of Things is presented as a disruptive technology that can lead to lasting change in all areas of life.<sup>2</sup> Contrary to the "Industrie 4.0" concept, the official concepts in Germany do not address this potential for revolution in public administration.<sup>3</sup> The strategy of the Federal Government "Verwaltung 2020" only

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<sup>1</sup> Just look at the reports of the big trade fairs like IFA Berlin.

<sup>2</sup> Anderson (2012).

<sup>3</sup> On the level of regional councils Bundesministerium des Innern (2014). For the definition of the term "administration 4.0" see for example Lucke (2016a, p. 183).

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indirectly refers to the Internet of Things, the eGovernment laws of the federal states and the countries do not at all.

Nevertheless, forecasts draw a different picture. In the year 2020, the projected turnover of the Internet of Things in the area of public administration in Germany is 3 billion euros.<sup>4</sup> There will be over 20 billion networked things worldwide.<sup>5</sup> Increasingly, scientific inquiries are being written about a new transformation of the administration under the key words "eGovernment 4.0"<sup>6</sup>, "public IoT"<sup>7</sup> or "Smart Government"<sup>8</sup>. Following this assessment, the question arises as to whether the Internet of Things in the administration can and should be used from a legal point of view and what the applicable legal framework concerning administrative law would be. The first legal assessments on the Internet of Things<sup>9</sup> have not yet been discussed from the perspective of administrative law.<sup>10</sup> We will also examine whether conclusions can be drawn from the transformative potential of the Internet of Things.

## I. The Notion of IoT

There is neither consensus on the concept of the Internet of Things in Computer Science nor in other discourses. A major study by the Institute of Electrical and Electronics Engineers (IEEE) identified more than 40 attempts at definition and found that deviations are often rooted in different preconceptions of the term.<sup>11</sup> Reduced to a core concept, the Internet means that objects of the environment are equipped with information technology systems in a way that they are networked, identifiable, and addressable, and can make certain observations via sensors, whereas the networked system as such can react to the observations. As an illustrative example, so-called traffic control systems on federal highways can be used.<sup>12</sup> On these streets, sensors measure traffic volume, weather conditions, and other safety-relevant circumstances. This data is forwarded to data centers, which can control traffic in real time via digital traffic signs by arranging speed limits, overtaking bans, or redirecting traffic.

Cyberphysical systems are much more complex and more powerful.<sup>13</sup> They are different applications and functions of the Internet of Things, which are interconnected. One example of this is the networked digital control of the entire system of electricity generation (smart grid). The basic idea behind the concept of the Internet of Things is that information technology is not tied to human use, but that computers can increasingly make autonomous perceptions, decisions, and can execute them through

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<sup>4</sup> Deloitte (2016), Transport and other local administrative services are not covered by the number.

<sup>5</sup> As compared to 4.9 billion in the year 2015.

<sup>6</sup> ("Industrie 4.0" braucht "Verwaltung 4.0", 2013)

<sup>7</sup> Flüge and Fromm (2016)

<sup>8</sup> Lucke (2016c)

<sup>9</sup> Bräutigam and Klindt (2015); Heun and Assion ; Schulz and Dankert (2016)

<sup>10</sup> But see assessment of administrative sciences like Schuppan and Köhl (2016); Flüge and Fromm (2016)

<sup>11</sup> IEEE (2015).

<sup>12</sup> Bundesanstalt für Straßenwesen (2015)

<sup>13</sup> NIST Cyber Physical Systems Public Working Group (2016).

actions. Although autonomy is a specific aspect of the Internet of Things, human participation in such processes is not excluded. IoT applications can also be combined with complex algorithmic decision-making mechanisms, which is referred to as "IoT Analytics," especially in business contexts.<sup>14</sup>

## II. Use Cases in Public Administration

Examples of application from the context of administration are explained here using the concepts of the Smart City and the Intelligent Transport System.<sup>15</sup>

### 1. Smart City

The term "Smart City" refers to a city planning trend which has existed for some time, according to which the application of information and communication technologies is intended to improve the life in cities and make them more sustainable.<sup>16</sup> The European Alliance for the Promotion of Smart City Concepts, the "Smart Cities & Communities Industrial Initiative," is based on an initiative of the European Commission.<sup>17</sup> Recent Smart City strategies are directly or indirectly related to IoT applications, as shown by the example of Berlin.<sup>18</sup>

IoT applications are already being used in municipal areas. In the streets of Barcelona, for example, sensors generate granular statistics on the air quality of the city.<sup>19</sup> Irrigation systems of public parks and gardens are also controlled by the integration of sensor networks and thus can save costs.<sup>20</sup> All data generated in this way can be viewed and utilized by a central point of contact in the city.<sup>21</sup> Such centralized data collection with many different applications is also planned in the South Korean city, Songdo; this city is extensively equipped with sensors to reduce energy and resource consumption.

### 2. Intelligent Traffic Systems

The implementation of so-called "intelligent traffic systems" has been planned and promoted for a number of years in the European context.<sup>22</sup> These often rely on IoT applications. An example of this is the so-called eCall system, an automatic emergency call system, which vehicle manufacturers as well as rescue services are obliged to

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<sup>14</sup> TechTarget (2014)

<sup>15</sup> For further information see Flügge and Fromm (2016); Lucke (2016a), intelligent infrastructure is represented here Picot (2015).

<sup>16</sup> Chourabi et al. (2012); Caragliu, Del Bo, and Nijkamp (2011)

<sup>17</sup> Investing in the development of low carbon technologies (SET-Plan) [COM(2009)519]

<sup>18</sup> Senatsverwaltung für Stadtentwicklung und Umwelt (2016)

<sup>19</sup> Adler (2016)

<sup>20</sup> Adler (2016)

<sup>21</sup> <http://opendata.bcn.cat/opendata/en>, 17.09.2016.

<sup>22</sup> The legal framework can be found in Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport Text with EEA relevance

implement until March 31, 2018.<sup>23</sup> Sensors in the vehicles automatically establish a telephone connection with a rescue center in case of an accident and send a text message with the most important information to the rescuers. In emergency situations, units in a vehicle communicate automatically with rescue centers. The above-mentioned traffic control systems also belong to the intelligent traffic systems.

### III. Practical Level: Opportunities and Risks

The Internet of Things affords opportunities as well as risks.<sup>24</sup> Great opportunities of the Internet of Things are seen in the advantages of sensor technology and the possibilities offered by data analysis and automated actions. In the field of sensor technology, it is possible to collect data automatically on a locally ubiquitous and temporally permanent basis.<sup>25</sup> This is particularly the case when large areas or remote locations have to be observed, as it is the case for tree cadastres. Another advantage of comprehensive sensor technology is that data can be collected much more accurately and granularly than with conventional instruments. IoT applications enable automated reactions. For example, fire-fighting robots and drones that can act with partial autonomy are being developed at the moment. The drones can move to the source of the fire more quickly, while the robots can be used in very dangerous fires without endangering humans<sup>26</sup>

There are various risks associated with the Internet of Things.<sup>27</sup> It mitigates certain risks, but can also create new vulnerabilities.<sup>28</sup> Inherent malfunctions can have serious consequences for involved parties. For example, accidents of autonomous buses used in public transport have been reported.<sup>29</sup> Especially in these cases it can be difficult for the injured to know who is responsible for the action of the systems. Sensing can also be a problem for the privacy of people whose data is being recorded.<sup>30</sup> As far as external threats are concerned, they affect, in particular, the integrity of the systems and the security of the data stored on them.<sup>31</sup> These attacks can render the system remote-controllable. The systems can also be used for other activities on the Internet. Due to insufficient IT security, IoT applications, which are connected to the Internet, can be

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<sup>23</sup> See the following legal acts of the Union Commission Delegated Regulation (EU) No 305/2013 of 26 November 2012 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the harmonised provision for an interoperable EU-wide eCall Text with EEA relevance; Regulation (EU) 2015/758 of the European Parliament and of the Council of 29 April 2015 concerning type-approval requirements for the deployment of the eCall in-vehicle system based on the 112 service and amending Directive 2007/46/EC; Directive 2007/46/EC of the European Parliament and of the Council of 5 September 2007 establishing a framework for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles (Framework Directive).

<sup>24</sup> For a general discussion see Novoselic (2016, p. 82)

<sup>25</sup> In relation to space and time see International Telecommunications Union [ITU] (2005, p. 2).

<sup>26</sup> Beer (2015).

<sup>27</sup> For summaries see Government Office for Science (p. 18); Federal Trade Commission

<sup>28</sup> Europol (2015, p. 8)

<sup>29</sup> ("Selbstfahrender Minibus: Postauto unterbricht Test nach Unfall," 2016)

<sup>30</sup> Article 29 Data Protection Working Party (p. 9)

<sup>31</sup> This is particularly important regarding the complexity of systems, see Samsel (2016, p. 122)

remote-controlled as computers. On a few occasions recently, DDoS attacks made certain Internet sites and services inaccessible using insecure IoT systems.<sup>32</sup>

#### **IV. Legal Level: Motivations, Limitations and Design**

If the public administration wants to implement an application of the Internet of Things, law can play different roles. It can be a reason for an acquisition, but also sets limitations. Finally, it can also provide guidance with regard to future procedures.

##### **1. Motivations**

By implementing IoT applications, administrative tasks can be provided more effectively and efficiently. In particular, special legal obligations of maintenance such as, for example, Section 3 (1) Fernstraßengesetz (Highway Act) or general safety requirements can be fulfilled through the Internet of Things. Even if there is no legal obligation, considerations of the best possible compliance with the law can argue for the application of automated procedures.<sup>33</sup> There is currently no concrete legal obligation for the Administration to implement IoT applications. If Article 14 (1) of the Constitution of Schleswig-Holstein stipulates the guarantee of the establishment and further development of digital basic services, it can be regarded as a general duty to adopt new technologies. Article 4 (f) & (g) of the Convention on the Rights of Persons with Disabilities also stipulates the safeguarding and promotion of new technologies that are appropriate for people with disabilities.<sup>34</sup> IoT applications could, to a certain extent, compensate for limitations. A legal motivation to use the Internet of Things is, however, particularly conceivable in the cases in which obligations to adopt the state of the art are imposed on the Administration. This could be particularly the case in environmental law.<sup>35</sup> For instance, where information systems are to be created, such as EIONET in European environmental law, the introduction of specific sensors, coupled with the Internet of Things, promises considerable advantages.<sup>36</sup>

Even from the rule of law, although it is very general, the administration is bound to act effectively; it aims at - to speak with Konrad Hesse - at the "rationalization of the general public state".<sup>37</sup> Thus the administration has to orient itself on standards of efficiency, profitability, and especially effectiveness.<sup>38</sup> The Internet of Things is going to be, according to these principles, obligatory for the administration to fulfill its promises, and

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<sup>32</sup> Maras (2015); Böck (2016); Goodin

<sup>33</sup> For labour protection see Weber and Weber (2010, p. 124)

<sup>34</sup> Convention on the Rights of Persons with Disabilities (CRPD) 2515 UNTS 3.

<sup>35</sup> See Weber and Weber (2010, pp. 118–121); for practical examples see Wettstad (2008, p. 974); A real obligation could follow from Art. 3 The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) 2354 UNTS 67.

<sup>36</sup> Heußner (2007)

<sup>37</sup> Hesse (1962, p. 83) see also Pitschas (p. 1732)

<sup>38</sup> Schmitz (2014, p. 76); Hoffmann-Riem (1998, p. 18).

is actually more effective and efficient than the fulfillment of tasks by humans.<sup>39</sup> Indeed, the rule of law – as well as statutory law - also sets limitations to the Internet of Things.

## 2. Limitations

From the many legal requirements that can be taken into account during the implementation of an IoT application, the law of data protection and IT security are exemplified, since these are often mentioned as limitations in this context.<sup>40</sup>

### a) Data Protection Law

The Internet of Things raises many data protection issues,<sup>41</sup> not least because of the possibility of automatic, ubiquitous, and permanent data collection.<sup>42</sup> In particular, the concept of personally identifiable information, the principle of necessity, and purpose limitation are to be examined.

#### aa) Applicability: Personally Identifiable Information

The decisive criterion for the applicability of the data protection law is whether personally identifiable information is being processed. However, the relevant criterion of identifiability is very controversial.<sup>43</sup> The question is, in particular, to what extent knowledge and skills of third parties should be taken into account. According to the Data Protection Directive, which the Bundesdatenschutzgesetz (Federal Data Protection Act) is based on, "all resources which could reasonably be used either by the person responsible for processing or by a third party"<sup>44</sup> should be taken into account. The Court of Justice of the European Union (ECJ) recently ruled that this was not the case "if the identification of the person concerned was legally prohibited or practically unviable".<sup>45</sup> The general data protection regulation provides that "the available technology at the time of the processing and technological developments" have to be taken into consideration.<sup>46</sup> However, the Internet of Things is already seen as a viable technical development,<sup>47</sup> because the possibility of automated, permanent and ubiquitous data

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<sup>39</sup> For further explanation of the terms efficiency and effectiveness see Hoffmann-Riem (1998, p. 17).

<sup>40</sup> One of many references is provided by Lucke (2016a, p. 180)

<sup>41</sup> See Bräutigam and Klindt (2015, pp. 1139–1140); Venzke-Caprarese (2015, p. 377); Hofmann and Hornung (2015, p. 212); For mobile applications see Scholz (2014)

<sup>42</sup> This text does not look at Directive (EU) 2016/680 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data by competent authorities for the purposes of the prevention, investigation, detection or prosecution of criminal offences or the execution of criminal penalties, and on the free movement of such data, and repealing Council Framework Decision 2008/977/JHA.

<sup>43</sup> Bergt (2015, p. 365)

<sup>44</sup> Recital 26 Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data.

<sup>45</sup> Case C-582/14: Judgment of the Court (Second Chamber) of 19 October 2016 (request for a preliminary ruling from the Bundesgerichtshof — Germany) — Patrick Breyer v Bundesrepublik Deutschland [46]. Considering that the General Data Protection Regulation has solved the issue of identification, the judgment is still relevant because of its definition regarding "legal considerations". IPv6 will also play an important part. A critical voice regarding this development is Bergt (2015, p. 370).

<sup>46</sup> Recital 26.

<sup>47</sup> Albrecht (2016, p. 98); Bräutigam and Klindt (2015, p. 1140); Schaar (2015, p. 43)

collection raises the question of the effectiveness of anonymisation more fiercely.<sup>48</sup> Particularly with regard to IoT applications and systems, several papers suggest to assume identifiability in general or at least in doubt.<sup>49</sup> On the basis of what is technically possible hitherto, a differentiated view is preferable,<sup>50</sup> especially in the administrative context. In the case of weather or pollen data identifiability might be denied.

## bb) Collection and Usage: Principle of Necessity and Purpose Limitation

The peculiarities of the Internet of Things in data collection (automation, ubiquity, permanence) also have an effect in the context of justifying the collection and use of data. According to § 13 (1) Bundesdatenschutzgesetz (Federal Data Protection Act), the central criterion for the collection of personal data is necessary to fulfill a task by the responsible authority. Necessary is data which "the public authority could not perform the task in question without in the sense of a *conditio sine qua non*, not completely, not lawfully or not in an appropriate time".<sup>51</sup> In the context of the legal fulfillment of tasks, it must be kept in mind that the measure must also be proportionate with regard to informational self-determination. An intervention is especially difficult when it concerns a high number of people;<sup>52</sup> these people have not caused the intervention,<sup>53</sup> the procedure takes place secretly or overtly<sup>54</sup> and the data used is of particular personal relevance. This personal relevance can result from the possibility of conclusions from metadata,<sup>55</sup> such as in the case of motion profiles.<sup>56</sup>

The Federal Constitutional Court has also made it clear that the prerequisite for the admissibility of a measure is a clear legal definition of the purpose of data collection. The purpose also limits the possibilities of data processing as stated in § 14 Bundesdatenschutzgesetz (Federal Data Protection Act). According to the case law of the Federal Constitutional Court, the purpose of the use of the data has to be "area-specific" and "precise".<sup>57</sup> It is a matter of controversy in the literature to see whether this should also be the case for eGovernment and Big Data.<sup>58</sup> While on the one hand there is a fear of the erosion of legal safeguards, on the other hand, the principle of purpose limitation and the legal architecture behind it is being criticised as the wrong regulatory

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<sup>48</sup> Article 29 Data Protection Working Party (p. 8)

<sup>49</sup> Steinmaurer (2016, p. 93); Šehić, Rengers, and Hense (2015, p. 398)

<sup>50</sup> Venzke-Caprarese (2015, p. 385)

<sup>51</sup> Gola, Klug, and Körffler (2015a, no. 3); Stender-Vorwachs (2016, no. 13)

<sup>52</sup> BVerfG, Beschl. v. 12.04.2005 – 2 BvR 1027/02 – BVerfGE 113, 29 (53); BVerfG, Urt. v. 27.07.2005 – 1 BvR 668/04 – BVerfGE 113, 348 (383); BVerfG, Beschl. v. 04.04.2006 – 1 BvR 518/02 – BVerfGE 115, 320 (354).

<sup>53</sup> Ibid.

<sup>54</sup> BVerfG, Beschl. v. 04.04.2006 – 1 BvR 518/02 – BVerfGE 115, 320 (353); BVerfG, Urt. v. 02.03.2006 – 2 BvR 2099/04 –, BVerfGE 115, 166 (194).

<sup>55</sup> Article 29 Data Protection Working Party (p. 9)

<sup>56</sup> BVerfG, Urt. v. 11.03.2008 – 1 BvR 2074/05 – BVerfGE 120, 378 (406). See also Roßnagel, Moser-Knierim, and Schweda (2013, p. 107)

<sup>57</sup> BVerfG, Beschl. v. 13.06.2007 – 1 BvR 1550/03 – BVerfGE 118, 168 (187 f); BVerfG, Urt. v. 02.03.2010 – 1 BvR 256/08 – BVerfGE 125, 260 = DVBl 2010, 503; BVerfG, Beschl. v. 24.01.2012 – 1 BvR 1299/05 – BVerfGE 130, 151 (202)

<sup>58</sup> For a rather broad understanding Eifert (2007, p. 139); for a rather strict view Roßnagel (2016, p. 564); for further references Grafenstein (2016, 234 Fn 2)

approach. The European regulator has proposed an interesting compromise with regard to the eCall systems and future innovations. The eCall system itself is limited to the purpose of automated communication with emergency call centers, as stated in Art. 6 para. 2 eCall regulation, and furthermore, there are strict anonymisation and deletion obligations. However, the manufacturers can provide a service with additional benefits on the sensor system, without the strict purpose of the eCall regulation being applicable to them.<sup>59</sup>

## b) IT Security Law

If the administration uses the Internet of Things, it must take adequate security precautions. This general duty to secure information technology systems can be derived indirectly from Article 91c (2), first sentence, of the Grundgesetz (German Constitution). Security requirements are imposed on the Administration in § 23 E-Government Act Berlin or Article 8 Bavarian E-Government Act. Various provisions such as § 9 Bundesdatenschutzgesetz (Federal Data Protection Act) or Article 32 General Data Protection Regulation (GDPR), § 13 (7) and § 109 Telemediengesetz (Telemedia Act) may lead to a general motivation to install technical and organizational safeguards.<sup>60</sup> According to all regulations, the measures must be proportionate.<sup>61</sup> Taking into account Telemediengesetz, Telekommunikationsgesetz (Telecommunications Act) and GDPR, the state of the art must be adopted. Which measures have to be adopted must be determined ad-hoc or taken from existing standards. Such standards may be drawn up by the Administration itself, or may come from industry associations and similar organizations.<sup>62</sup>

Since the Internet of Things can develop its specific potential when different systems are interlinked and interoperable, some applications have also been standardized with regard to IT security. In the context of introducing the eCall systems, different standards for the safety of the systems were developed.<sup>63</sup> If a government agency wants to implement a specific application, it can also create a security model or extend its security model beyond specific legal obligations.<sup>64</sup> Such situations, additionally, can be helpful in accruing experience for the general regulation of systems of the Internet of Things. This can be successful by establishing an exchange of knowledge between different authorities at different levels. Such an exchange is also of great importance for the closure of security gaps. Even if administration generally does not fall within the scope of section 8b (4) BSI-Gesetz (Act on the Federal Office for the Security of Federal

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<sup>59</sup> Recital 15 Directive 2007/46/EC of the European Parliament and of the Council of 5 September 2007 establishing a framework for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles (Framework Directive).

<sup>60</sup> On the details see Eckhart (2013); Djefal (2015); Gola, Klug, and Körffer (2015b); for a specific example in the context of cars see Rammo and Holzgräfe (2014, p. 361)

<sup>61</sup> The costs of the measure must be proportionate the aim of the system that is to be secured.

<sup>62</sup> See for example Industrial internet Consortium

<sup>63</sup> BS EN 16072:2015 Intelligent transport systems. ESafety. Pan-European eCall operating requirements; BS EN 16072:2011 Intelligent transport systems. eSafety. Pan-European eCall operating requirements

<sup>64</sup> For such models see Wehrmann, Bluhm, and Rink (2016, 255f); Eckert (2014, pp. 35–44)



Information Technology) and the NIS directive, an information exchange will nevertheless be beneficial.<sup>65</sup>

### 3. Design

The law not only provides motivations and limitations for the implementation of Internet of Things in public administration, but also can contain a mandate for design.<sup>66</sup> Such a design may also be necessary as the automation of administrative processes is so qualitatively new that it requires new regulation.<sup>67</sup> This is not only about the lawful design of the technology, but also about understanding the steering effects and potentials of law and technology and of using them to achieve the administration's goals.<sup>68</sup> The design possibilities and necessities resulting from this are explained here by the example of § 35a Verwaltungsverfahrensgesetz (VwVfG; Federal Administrative Process Act).

#### a) § 35a VwVfG and its Purpose

§ 35a Verwaltungsverfahrensgesetz (Federal Administrative Process Act), which came into effect on January 1, 2017, regulates for the first time the issuance of administrative acts exclusively by automatic means.<sup>69</sup> In the course of the legislative process for the modernization of the taxation procedure, the legislature decided not only to change the Abgabenordnung (General Taxation Act), but also to change the general administrative procedure and the social administration procedural law.<sup>70</sup> Contrary to Section 155 (4) of the Abgabenordnung (General Taxation Act) and Article 31a of Sozialgesetzbuch X (Tenth Book of the Social Security Act), Section 35a of the Verwaltungsverfahrensgesetz (Federal Administrative Process Act) requires, as a general rule, further interpretation.

The purpose of the provision becomes clear, especially in the light of its genetic history. Due to the parallel development, the legislator can draw on the purpose of automating tax administration. In addition to the regularly mentioned advantages, such as the efficiency and speed of the procedure, the legislator also emphasized another aspect: the procedure should not lead to a "less intensive examination and decision quality".<sup>71</sup> The aim is to achieve a "concentration of human resources on cases which are really

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<sup>65</sup> Exceptions are traffic and intelligent traffic systems, see Appendix II 2 d Directive (EU) 2016/1148 of the European Parliament and of the Council of 6 July 2016 concerning measures for a high common level of security of network and information systems across the Union

<sup>66</sup> For the design dimension see Köhl, Lenk, Löbel, and Schuppan (2014, p. 31)

<sup>67</sup> Luhmann (1997, p. 12) see generally Kaiser (2009, pp. 111–135)

<sup>68</sup> For this interdependence see Lessig (1999, p. 501); see further for the context of IoT applications Schulz and Dankert (2016)

<sup>69</sup> Previously, there were only provisions to enable assistance by machines such as § 28 Abs. 2 Nr. 4, § 37 Abs. 4, § 39 Abs. 2 Nr. 3. Federal Administrative Process Act, Schmitz (2014, no. 77) siehe Schmitz (Fußn. 38), Rdnr. 77; there were also specific regulations such as § 6a Federal Data Protection Act, Art. 22 General Data Protection Regulation, § 67b Abs. 4 Tenth Book of the Social Security Act, § 114 Abs. 4 Civil Servants Act.

<sup>70</sup> See Schmitz and Prell (2016); Braun Binder (2016b)

<sup>71</sup> Federal Government, Draft of an Act for the Modernization of Tax Procedure, 03 February 2016, 48.

necessary".<sup>72</sup> Here, automation is placed in the context of several procedures so the immediate danger of automation, namely the loss of the personal relationship between authority and addressee, is reversed. Automation can not lead to less, but to more meaningful human contact. A human decision is only better if the deciding person has sufficient time and professional resources at his or her disposal. Automation on the one hand and citizen orientation and humanity on the other are no longer at odds with one another. This aspect of the law's purpose is to be referred to here as process humanization by automation. Automation could thus redeem the promise of citizen orientation, which had already been linked to the digitization of the administration.<sup>73</sup> This is part of a way of thinking that would encourage use of technology that allows for a closer exchange between citizens and the state.<sup>74</sup> Not only the Internet, but also the Internet of Things, as a vision of increasing automation, can be of constitutional importance in this view because the newly available resources can be used to take citizens' concerns more seriously.<sup>75</sup>

#### b) Reservation of a Legal Provision

As a result, the reservation of a legal provision is a "reservation to design", which calls for a "preliminary planning decision"<sup>76</sup> to ensure the legal conformity of automated administrative procedures. The concept of legislation covers both laws and other legal regulations.<sup>77</sup> For various legal reasons at different levels, it is assumed that on the basis of a technology assessment, the legislator must design the procedure in such a way that the procedural rights of the addressee are preserved.<sup>78</sup> This already follows from the procedural dimension of fundamental rights, which says that fundamental rights influence procedures and organization, particularly in administrative procedure.<sup>79</sup> From this, a "constitutional obligation" was concluded, which reaches to the point where "a specific procedure or organizational form as such" can be asked.<sup>80</sup> How the procedure may be changed can be exemplified by § 155 (4), sentence 1, sentence 3 Abgabenordnung (General Taxation Act).<sup>81</sup> The tax orders specified there can be issued automatically insofar as "there is no reason to deal with the individual case by officials". Further design possibilities can be derived from the provisions of the GDPR.<sup>82</sup> Article 22 of the GDPR regulates decisions based on the automated processing of personal data<sup>83</sup>

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<sup>72</sup> Ibid.

<sup>73</sup> Eberle (1987, p. 473); Eifert (2014, 421 Fn. 4); for a critical analysis see Bull (2017, p. 414).

<sup>74</sup> Pernice (2015, p. 33, 2013, p. 6)

<sup>75</sup> See generally Pernice (2015, p. 33); yet, it relates to technical and legal implementation.

<sup>76</sup> Eifert (2006, p. 127)

<sup>77</sup> Schmitz and Prell (2016, p. 1276); see generally Ronellenfitsch (2016, no. 56); for a broad interpretation see Siegel (2017, p. 25)

<sup>78</sup> See also Schmitz and Prell (2016, p. 1276)

<sup>79</sup> 80 Wegweisend BVerfG, Beschl. v. 18.12.1968 – 1 BvR 638/64 – BVerfGE 24, 367 (401), DVBl 1969, 190; und BVerfG, Beschl. v. 20.12.1979 – 1 BvR 385/77 – BVerfGE 53, 30 (65 f.); for the development of jurisprudence see Laubinger (1982, p. 62); Schmidt-Abmann (2006, p. 995)

<sup>80</sup> Schmidt-Abmann (2006, p. 1002)

<sup>81</sup> Braun Binder (2016a, p. 526)

<sup>82</sup> Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)

<sup>83</sup> Lewinski (2016); Martini (2017)

and protects not only the interests but also the fundamental rights of the addressee.<sup>84</sup> The 71st recital of the GDPR mentions, for example, specific information, a claim for direct intervention by a person, and a statement of the position, explanation and contestation of the decision. This means that both the individual procedure as well as the institutional and organizational aspects must be considered. It is possible to revert the "decision-making responsibility" to the administrator by means of procedural provisions, for example if the person concerned so requests.<sup>85</sup> A transfer of the procedure to a human decision may, however, be initiated by technical presetting or by the objection proceedings, as in the case of § 155 (4) sentence 3 Abgabenordnung (General Taxation Act).

From an institutional and organizational point of view, the provision of the appropriate specialist in an authority is not a trivial problem.<sup>86</sup> In particular, when complex algorithms make decisions, transparency and traceability of these decisions are very difficult to ensure.<sup>87</sup> Viktor Mayer Schönberger has therefore demanded the introduction of a new profession of algorithmics.<sup>88</sup> Beyond safeguarding of special knowledge in an authority, one can also think of placing decisions in the hands of an authority with greater independence, which could also be the task of individual protection.

### c) No Margins of Appreciation

The second requirement of § 35a *Verwaltungsverfahrensgesetz* (Federal Administrative Process Act) is that "there is neither a margin of discretion nor of appreciation." Margins of appreciation, which in any case only exist within certain narrowly defined cases, are to be excluded here. The negative presupposition of the non-existence of a margin of discretion in § 35a *Verwaltungsverfahrensgesetz* (Federal Administrative Process Act) can be interpreted abstractly or concretely. If this provision is interpreted in an abstract manner, a fully automatic decision cannot be taken into account if the legal basis of the administration confers a discretion. However, one could also ask concretely whether there is still room for discretion. This would not be the case if the authority had already exercised it. The exercise of the discretion is then the installation of the facility.

A strong argument for the abstract view is that the legislator has emphasized the necessity of a human decision.<sup>89</sup> This is consistent with a long-established view which, in principle, precludes the adoption of administrative acts by automatic bodies if the legal basis of the administration has a margin of discretion.<sup>90</sup> The exception rule of § 31a *Sozialgesetzbuch IX* (SGB IX; Ninth Book of the Social Security Act) shows that the legal system does not generally rule out the exclusion of automated decisions. Here, it is assumed that it is not necessary for every decision based on a discretionary standard

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<sup>84</sup> Art. 22 Sec. 2 Subsec. b requires „suitable measures to safeguard the data subject's rights and freedoms and legitimate interests“; Art. 23 Sec. 1 requires restriction to respect “the essence of the fundamental rights and freedoms and is a necessary and proportionate measure in a democratic society to safeguard”.

<sup>85</sup> See generally Schmidt (1971, p. 347); critically because of a lack of efficiency Wieacker (1978, p. 70)

<sup>86</sup> Organisational changes are reviewed by Eberle (1987, pp. 464–465)

<sup>87</sup> Reichwald and Pfisterer (2016, p. 2012); Rice (1953); Lucke (2016b, p. 167)

<sup>88</sup> Mayer-Schönberger and Cukier (2013, pp. 189–192); see also Hill (2015, p. 284)

<sup>89</sup> Report of the financial committee of the Bundestag, 11 May 2016, 121

<sup>90</sup> Lazaratos (1990, pp. 222–229); Degrandi (1977, pp. 77–90); Martini and Nink (2017, p. 682)

to be made by a person. This is because the rationale of the law itself shows that automation is precisely the humanization of the process and can lead to more justice if resources are better allocated.<sup>91</sup> This was also a major reason for the modernization of the taxation procedure, since the Federal Court of Auditors noted in 2006 that a uniform enforcement of tax law was no longer guaranteed.<sup>92</sup> This also means that atypical cases are separated by technical measures or at the request of the addressee.<sup>93</sup>

In the case of certain tasks, the Authority should also be allowed to type only specific measures without exhausting its discretion. The fact that a "pre-programmed" exercise of the discretion is not fundamentally unlawful can also be seen in the comparison to the general exercise of discretion,<sup>94</sup> i.e. when an authority decides on the basis of typed and schematized guidelines. In general discretionary decisions, there is also the risk of ignoring atypical decisions, but they can even be indicated, in particular, for reasons of equality.<sup>95</sup>

The concrete interpretation prevents that already implemented applications have to be dismantled or based on a different legal basis and that future developments are hindered. This can be demonstrated, in particular, by the traffic control systems previously mentioned. These may be issued as general ordinances, which are discretionary decisions according to § 45 Straßenverkehrsordnung (Road Traffic Act).<sup>96</sup> The jurisprudence in this context has hitherto not been irked by this exercise of discretion by automatic means.<sup>97</sup> The Federal Administrative Court has, on the contrary, equated an algorithm-based traffic control system with a permanent administrative act, even if the traffic control system does not constantly indicate traffic signs.<sup>98</sup>

The possibility of an automated discretionary exercise would keep the German Administrative Procedure Law open for development and innovation, for example to profit from the advantages of automated big data analytics. In the international trend, digitization of the administration is dynamic, especially in countries such as Estonia and Austria. Faced with technical innovations, such as machine learning and self-learning algorithms, traditional notions of automating discretion might soon become obsolete. Especially in the case of complex administrative decisions with many different parameters, the respective purposes of the discretion could be achieved better automatically than by human decision. For the above reasons, it is indicated not to generally prohibit an automated exercise of discretion but to leave it within the limits of the rule of law. The Administration may exercise its discretion through automated facilities and design IoT applications in such a way that special circumstances of the individual case are also taken into account in accordance with certain guidelines.<sup>99</sup>

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<sup>91</sup> Compare Polomski (1993, pp. 57–58)

<sup>92</sup> Baldauf (2016, p. 834)

<sup>93</sup> Maurer (2011, p. 147)

<sup>94</sup> Eberle (1987, p. 463); Schmidt (1971, p. 352); Gruber (1971, p. 64); Fadavian (2016, p. 129)

<sup>95</sup> For this argument see Fadavian (2016, p. 129)

<sup>96</sup> Heß (2016, no. 3)

<sup>97</sup> OLG Celle, Beschl. v. 28.03.2013 – 311 SsRs 9/13 –; BVerwG, Urt. v. 23.09.2010 – 3 C 37/09 –, BVerwGE 138, 21; VG Bremen, Urt. v. 29.07.2010 – 5 K 56/05.

<sup>98</sup> BVerwGE 138, 21; VG Bremen, Urt. v. 29.07.2010 – 5 K 56/05.

<sup>99</sup> For the differences see Hill (2015, p. 272)

## **V. The Internet of Things as new Cornerstone of Public Administration?**

After all, law can impose limitations and mandates for technological design of the application of the Internet of Things in public administration, but can also serve as a reason to implement such technologies. Whether the introduction of automated procedures Through the Internet of Things creates radical changes in administration and administrative law, is another question. In the following, five theses with regard to this question are to be condensed from what has already been said:

### **1. Transition of Roles for Humans and the Public Administration**

An extensive application of the Internet of Things by the administration would mean a substantial change, because information would be collected automatically, decisions could be made automatically, and actions could be carried out automatically. On all three levels, administrative action is changing. The Internet of Things has thus the potential to incite a structural change of the administration: the execution of policies and laws would take place by automatic means; The enforcement would no longer be a matter of a bureaucracy that builds on people. Human action focuses on programming in advance and on the follow-up of critical decisions. If things have already been attributed agency in the past,<sup>100</sup> this agency is not only obvious and immediately perceivable through the Internet of Things. Behind such agency there is also state authority. It is becoming more and more feasible that law enforcement is automated. All this changes what administration does and means:

### **2. Public Administration as Cooperative Legislator**

Even if actions are predetermined to a high degree, in the concrete situation of the action the decision no longer lies with a human agent. Human participation is then particularly concentrated on the process of programming and implementation, i.e. the "preliminary decision". This preliminary decision exercises law indeed, but also embraces a legislative component. In the process of implementation, there are opportunities but also necessities to cooperate with other actors.

### **3. Control and Communication in the Public Administration**

The introduction of IoT systems creates a knowledge base for an administration of unprecedented quality.<sup>101</sup> IoT systems offer the possibility of automated, ubiquitous, and permanent collection of data. This new data base promises to positively influence the effectiveness of administrative decisions. After all, the consequences of those actions can be better screened and understood. At the same time, however, this also means the construction of considerable knowledge power and information asymmetries,

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<sup>100</sup> Latour (2000, 2008)

<sup>101</sup> Novoselic (2016, p. 85)

especially against other actors. By integrating data protection, freedom of information and self-restraint, the administration must find a balance here. The new information power of the administration, its changed role in the implementation of the law and related challenges to the legislator do not lack impact on the understanding of the state and the constitution in the digital age. The increased possibilities of enforcement through a broader knowledge base and more effective options for action can also have a strong repercussions on the existing legal norms. Under these conditions, new consideration should be given to equity in law.<sup>102</sup>

#### **4. Changes in Proceedings and Structure**

Automation also places particular demands on the administrative process. § 35a *Verwaltungsverfahrensgesetz* (Federal Administrative Process Act) refers to special regulations, which are to be made by the legislator. In the case of an extensive introduction of IoT applications, however, this could lead to a growth in regulation. The legislator will have to reflect on the adaptation of the administrative procedure and, in particular, the generalization of institutions and principles. In addition, questions will arise as to how the structures which have grown have to be adapted, from the role of the official to the federal structure of the German and European administration.<sup>103</sup> In the course of the increased complexity and transparency of technical procedures, it will be challenging to build up expert knowledge for the administration, but also to make it accessible to the public. In this case, a competent independent authority should be considered, whose task could also be individual protection.

#### **5. The Struggle for the Purpose of Automation**

The vision of the Internet of Things is a vision of automation in which computers are ubiquitous and networked into the environment. Such systems open up possibilities, but do not specify their use cases. An implementation in the public administration must not leave the question of the specific use case unanswered.<sup>104</sup> In an automated system in which mainly things are acting, it seems obvious that this leads to furthering the distance between state and citizen. Already the law on the modernization of the taxation procedure, however, suggests that this is not the only possible purpose. Rather, the goal of automation can also be to free human resources and to redirect them where they are really needed. When IoT applications are implemented with this goal, it is no longer just a matter of moving from the Internet of computers to the Internet of Things, but the transition from an administrative machine based on people to a human administration based on machines. The combination of man and machine then ensures efficient and humane action. The promises of effectiveness and efficiency are, in this context, the building blocks of a larger project that would intentionally use the potentials of technological progress to positively influence the relationship between

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<sup>102</sup> For equity see Pernice (1991).

<sup>103</sup> The role of the federal structure is explained in Köhl et al. (2014, 77ff); for a new constitutional provision enabling more cooperation see Peuker (2015)

<sup>104</sup> Schliesky (2015, p. 9)

citizens and their state by establishing a new quality in the communication.<sup>105</sup> This purpose does not necessarily follow from the technology or the technical vision of the Internet of Things, but it is also not excluded. This humanist purpose must be sought after by actively shaping the automation of public administration.

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<sup>105</sup> Pernice (2015, p. 33, 2013, p. 6)

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