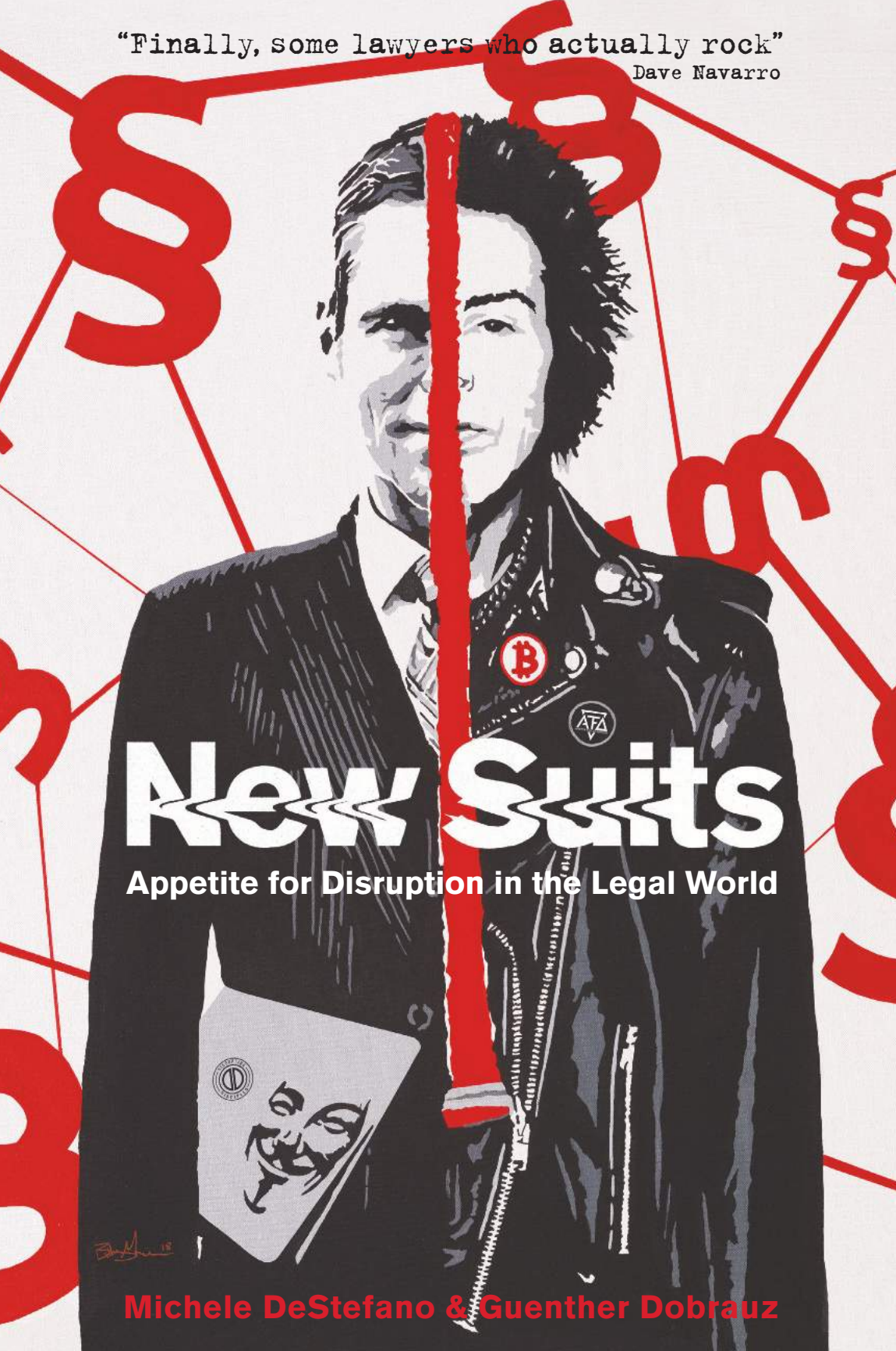
"Finally, some lawyers who actually rock"
Dave Navarro



New Suits

Appetite for Disruption in the Legal World

Michele DeStefano & Guenther Dobrauz

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SupTech

Challenges posed by supervisory transformation

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1 The essay reflects the personal opinion of the author. The statements do not claim to correspond to the position of the Financial Market Authority (FMA) Liechtenstein. Please also note the following restriction: In accordance with the nature of the topic and the author's resumé, with respect to the regulatory influence, this paragraph refers solely to European regulation of securities and the markets. This focus includes collective investments and their management companies, the asset management companies, financial instruments as well as further topics related to the capital markets. SupTech is also tangibly represented via the transaction data delivery of MiFIR and EMIR as well as the fundamental principles of the GDPR, MiFID II and PSD2.

I. Prologue

The following essay aims to illustrate the extent to which SupTech can play a role in ensuring that supervisory authorities are not subject to information bias and can instead integrate the findings from *Bonini's* paradox[2] in the management of big data. The goal of all this is to be able to achieve efficient and effective data management with due regard to prudent use of the fees and levies provided by the intermediaries.

But first a look at the history of literature: The novel *Sylvie and Bruno Concluded*[3] by *Lewis Carroll*, a British author from the Victorian era, was published in 1893. It tells the story of a one-to-one scale map: a map as a reproduction of reality, but without any form of simplification or (risk-based) focus on important cartographic events.[4] In the novel, the map was produced on the orders of the Emperor. In today's European regulatory environment, a (rule-based) directly applicable regulation[5] would be chosen. Although it was extremely expensive to produce the map, it was in fact never used. This was because whenever the map was unfolded, the farmers fought vociferously against the blocking of their fields. The insights gained from the one-to-one scale map could therefore only be exploited if the productivity of the working population suffered. This would be considered a case of overregulation today. Over time, the country itself was used as the map for the sake of simplicity, and it was determined that not only was this just as good as using the one-to-one scale map, it also enabled them to avoid the negative side effects described above.

A map on a scale of one-to-one is therefore impractical as a collection of all representable and geographically accessible information about a country. It is also a cumbersome process to have to record all details of reality down to the micro level. A map on a scale of one-to-one becomes an end in itself and the technical measurement effort, amount of data and production costs increase disproportionately each time the scale comes closer to the ever-changing reality.[6]

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2 *See* Charles P Bonini, Simulation of information and decision systems in the firm (Literary Licensing, 1963).

3 *See* Lewis Caroll, Sylvie and Bruno Concluded (Ray Dyer ed., 2015) (1893).

4 *See* Margherita Barile, *Bijective*, MathWorld (Dec. 18, 2018 10:00 AM), http://mathworld.wolfram.com/Bijective.html (last visited Feb. 1, 2019).

5 *See* University of Portsmouth European Studies, *Direct applicability and direct effect*, http://hum.port.ac.uk/europeanstudieshub/learning/module-3-governance-in-a-multi-level-europe/direct-effect-and-direct-applicability (last visited Dec. 18, 2018).

6 Anyone who has ever searched for a street using *Google Earth* knows what the above-mentioned authors are talking about. But none of them would have ever thought that today you can use a one-to-one scale map in electronic format on a smartphone. With *Google Earth* for instance you can overlay satellite and aerial images of different resolutions with existing geodata. The infor-

We become subject to information bias,[7] on the one hand, and on the other to *Bonini's* paradox. Information bias states that people often take better decisions when they have less information but assess this conversely. It is generally the case that information is instead collated for the decision, even though the information collated is irrelevant for the decision itself. *Bonini's* paradox reveals that the more comprehensive models of complex systems become, the more incomprehensible these are in actual use. This is because the more realistic a model is, the more difficult it is to understand the real underlying process that the model is actually intended to reproduce (simply). We suffer from information overload and have too much information to be able to process this, or can't see the forest for the trees, as the saying goes. We will return to the image of the map once again in the appraisal at the end of these considerations.

II. SupTech as a Cross-Disciplinary Approach

A. Concept and Meaning

SupTech is a cross-disciplinary and portmanteau term at the same time. It consists first of all of the financial market authority as a supervisor (with Sup as an abbreviation for supervision) of a country's financial market. With its supervisory activity the financial market authority ensures stability for financial institutions and the financial market and provides protection for customers. The financial market authority takes the necessary actions aimed at protecting customers and the reputation of the financial center in the event of breaches of the supervisory regulations. As part of efforts to combat malpractices, the financial market authority also persecutes cases in which activities requiring licensing are executed without the respective license. Secondly it consists of the concept of the latest technologies (with Tech as an abbreviation for technology), which primarily including electronic data processing (EDP).

As a cross-disciplinary approach, SupTech ensures a balancing act between the traditional activity of the financial market authority combined with the technological developments of the modern era. As a portmanteau term, SupTech aims to represent this connection in the same way as the related concepts FinTech and RegTech. However, SupTech refers to the originary activities of the financial market authority.

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mation offered is enormous, but does it also serve the purpose of a location determination and smart orientation? Often only the simplification of the view (i.e., the enlargement of the scale) helps to be able to gain the overview again.

7 *See* Michael Vaughan, The Thinking Effect: Rethinking Thinking to Create Great Leaders and the New Value Worker (Nicholas Brealey Publishing, 2012).

According to my research, the term was mentioned for the first time in a *Toronto Centre* publication dated August 2017[8] and then coined for a wider audience by *Ravi Menon* from the *Monetary Authority of Singapore (MAS)* at the occasion of the *FinTech Festival* November 2017[9]. Both of SupTech's definitions largely focus on strengthening supervision and reducing compliance costs. It does so by using innovative technology to support supervision. In essence, SupTech is the term that describes the paradigm shift in financial supervision as a result of the financial crisis and the emerging FinTech industry. SupTech helps authorities in their digitalization projects to make reporting and regulatory processes more efficient and agile. With digitalization, financial supervision is moving away from the current (over)reliance on reports of past data, extensive on-site inspections and delayed supervisory actions towards a pro-active, intrusive, forward-looking and intensive financial supervision. This requires more frequent and more granular data, sophisticated analytics, and sound data processing capabilities.[10]

Currently, SupTech initiatives can be observed at a number of financial market authorities around the globe. They predominantly focus on data collection, data analytics, and also data exchange.[11]

B. Boundaries

SupTech is not RegTech is not FinTech. Despite all the necessary delimitations, there are also plenty of overlaps. FinTech is examined from various sides in this anthology and I will refrain from making further comments on this.

As another portmanteau term, RegTech is a fusion of the words Regulatory and Technology. The latest technologies should be used to support regulatory management from an efficient and effective IT perspective within the financial market architecture and at the level of financial market intermediaries. The idea is that RegTech should automate the management of the flood of regulation (regulatory tsunami) with the aid of electronic data processing so that scalability can also be achieved in the regulatory area. As such, RegTech

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8 *See* Toronto Centre, *FinTech, RegTech and SupTech: What They Mean for Financial Supervision* (2017), https://res.torontocentre.org/guidedocs/FinTech%20RegTech%20and%20SupTech%20-%20What%20They%20Mean%20for%20Financial%20Supervision.pdf (last visited Feb. 3, 2019).

9 The author was a participant in this event and followed the presentation of the referenced person.

10 *See* Toronto Centre, *supra* note 8, at 10.

11 *See* Dirk Broeders & Jermy Prenio, *Innovative technology in financial supervision (suptech)—the experience of early users*, Bank for International Settlements—FS Insights on Policy Implementation No. 9 (2018), https://www.bis.org/fsi/publ/insights9.pdf (last visited Feb. 3, 2019).

represents the counterpart of SupTech, or in other words: SupTech is RegTech for supervisory authorities. FinTech on the other hand refers to the use of electronic data processing across the financial service provider's entire value chain.

III. Economic and Social Sciences Influence

A. General

According to *Richard A Posner,* application of the economic analysis of law is neither new nor is it controversial. He believes that the only thing that is controversial is the diverse nature of problems in the world of law that should now be examined in more detail using economic analysis of law, and in particular the so-called Financial Market Authority Act.[12] If jurisprudence limits itself to the interpretation of existing norms and the recording of ambiguities, then it deprives itself of any role in the process of continuing to develop the law.[13]

Thus, calling upon economics as a social science to examine and assess legal issues ensures legal progress as opposed to simply ensuring the extraction of direct judgements within the scope of legal doctrine. The supervisory regulations are now examined more closely against the background of new institutional economics and behavioral finance. The financial market supervisory authorities are also prone to the following cognitive biases. The supervisory authorities do not know all of the information any more than the *homo economicus*[14] (although they frequently already have plenty of information); and they can not always act—detached from practical constraints effectively and rationally as they are bound inter alia by administrative regulations.[15]

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12 *See* Richard A Posner, *Recht und* Ökonomie*: Eine Einführung (Law and economics: an introduction)* 90 *in* Ökonomische Analyse des Rechts (Economic analysis of law) (Heinz-Dieter Assmann et al., 1993).

13 *See* Jan C Schuhr, Rechtsdogmatik als Wissenschaft: rechtliche Theorien und Modelle (Duncker & Humblot, 2006) at 35.

14 The model of the homo economicus is an abstraction of human behavior and is used as a basis for analyzing economic correlations in neoclassical economics. The principal characteristic of the homo economicus is their ability to engage in perfectly rational behavior and their attempts to maximize utility. Complete information that is available without restriction is a further characteristic assumption. The homo economicus knows all options for action and their consequences.

15 *See* instead of many with further notes Marcel Lötscher, Die vermögende Privatperson als qualifizierter Anleger (Tectum Verlag, 2014) at 143–173.

B. New Institutional Economics

1. Introduction

New institutional economics is a more recent theory in economics that examines the effect of institutions on economic units (private households, companies). A distinction needs to be made between new institutional economics and (so called old) institutional economics.

New institutional economics is an established global field of research today that has its origins in the 1970s. It is concerned with the development and impact of the institutional framework of exchange processes. As such, new institutional economics can be viewed as a further development of neoclassical economics that specifically requires this institutional framework with the assumption of the *homo economicus* as a given. New institutional economics advises choosing the institution or organization that sees honesty as more rewarding than dishonesty and thereby possesses an inherent self-assertive power.[16]

The property rights approach, transaction cost approach, and principal-agent theory form the general core of new institutional economics. This is because every actual economic interaction affects property rights and involves transaction costs and at least two contracting partners who represent their own interests in each case.[17]

According to new institutional economics, the limited capacity for information processing is the greatest flaw of the neoclassical assumption of perfect information.[18] The neoclassical assumption is subject to the fact that all stakeholders on the market are fully informed on time and free of charge. However, stakeholders on the market in particular take decisions without having complete information available. Market failures then occur as a result of information deficits if the information is distributed asymmetrically among the market stakeholders and the functioning of the financial market is impaired as a result.[19]

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16 *See* Gabler Wirtschaftslexikon, *Neue Institutionenöknomik*, https://wirtschaftslexikon.gabler.de/definition/neue-institutionenoekonomik-38077 (last visited Apr. 15, 2019).

17 *See* Elisabeth Göbel, Neue Institutionenökonomik: Konzeption und betriebswirtschaftliche Anwendungen 60 (UTB, 2002).

18 *See* Birger P Priddat, Strukturierter Individualismus: Institutionen als ökonomische Theorie 250 (Metropolis Verlag, 2005).

19 *See* Michael Fritsch, Marktversagen und Wirtschaftspolitik: Mikroökonomische Grundlagen staatlichen Handelns 247 (8th ed., Vahlen, 2011).

2. Principal-agent theory

The principal-agent theory covers cases where information is distributed asymmetrically between the principal[20] and agent.[21] The principal knows less or is able to observe less than the agent. The information asymmetry may exist before and/or after the conclusion of the contract or in both instances. Accordingly, the agent has an incentive to behave opportunistically before and/or after the conclusion of the contract or in both cases.[22] However, the principal expects a fair return service from the agent to whom he assigns specific tasks as part of the order. Measuring this performance is difficult, however, as there is no complete or free market transparency. This makes the risk of the principal being deceived by the agent a significant one.[23]

The agent has an informational advantage over the principal and is therefore better able to assess its opportunities. The principal's ability to monitor and evaluate the agent's actions on the other hand is not satisfactory. As a utility maximizer the agent will also use this informational advantage for its own needs and not act solely in the principal's best interests. The three most significant problem areas with the principal-agent theory are hidden characteristics, hidden action, and hidden information, which are outlined briefly below. Hidden characteristics involve the problem that the principal is unable to learn the agent's characteristics before conclusion of the contract, either with respect to the agent's character or to the products and services provided by the agent. These characteristics frequently remain hidden and there is a risk of an adverse selection. The problem of hidden action only arises after the contract has been concluded, describing the fact that the principal is unable to monitor the agent's activities continuously. Hidden information refers to the problem that although the principal is able to monitor the agent's activities, he does not have the specific knowledge required to assess these activities. The greater the agent's special knowledge the more likely it is that there will be hidden information as a result of the prevailing information asymmetry. As utility maximizer, the agent will then select the action that involves the greatest benefit for him personally.[24]

This information asymmetry between the principal and agent, the parties' conflicting goals, and the self-serving behavior of the homo economicus as a utility maximizer form the premises of the principal-agent theory.

The asymmetric distribution of information means that consumers will only base their willingness to pay on the average quality to be expected. Ser-

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20 The principal is e.g., the financial market supervisory authority.

21 The agent is e.g., the financial service provider.

22 *See* Rudolf Richter & Eirik G Furubotn, Neue Institutionenökonomik: Eine Einführung und kritische Würdigung 596 (4th ed., Mohr Siebeck, 2010).

23 *See* Göbel, *supra* note 17, at 62.

24 *See* Göbel, *supra* note 17, at 100–103.

vice providers offering above-average quality will, therefore, generate comparatively lower profits as they are required to cover higher costs. Providers are thereby forced to produce goods of average quality at the maximum. However, if consumers becomes aware of the reduction in average quality, they will adapt their willingness to pay accordingly. This negative spiral only ceases once the worst possible quality of goods can be offered, and the price settles at the lowest level. This negative spiral is termed adverse selection.[25] There is uncertainty regarding quality as the parties are unable to monitor certain characteristics (hidden characteristics) or information (hidden information) prior to conclusion of the contract.[26]

A moral hazard refers to those problem situations that arise from hidden actions and hidden information.[27] The agent either has more information available than the principal after concluding the contract or the possibility for hidden action presents itself to him. *Richter and Furubotn* speak here of opportunism after conclusion of the contract (ex post opportunism).[28] This results in behavioral uncertainty among the stakeholders.

Information asymmetry can frequently be reduced with the relatively poorly informed market participant, i.e., the principal, attempting to acquire additional information (screening) and/or the relatively well-informed market participant, i.e., the agent, distributing information that is as credible as possible about the good quality offered by them (signaling). In summary, the uninformed party should improve his/her level of information and the better-informed party should provide more information.[29]

Information asymmetry can also be reduced by attempting to lessen the imbalance through controls, and the objectives can be harmonized through skilled design of tangible incentive schemes. A trusting relationship can be established between the principal and agent to complement both these solutions and mitigate the parties' opportunistic behavior. The principal draws more trust as the agent strives to reduce the information asymmetry and provides evidence of trustworthiness before and after conclusion of the contract.[30]

The supervisory authority can require service providers to provide information proactively about important product characteristics or contractual amendments of material content in each case. This can occur e.g., through mandatory publication obligations or further specific responsibilities to provide information. However, information asymmetry will not be rectified completely as a result of any transparency ordered by lawmakers. The information

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25 *See* Fritsch, *supra* note 19, at 250.
26 *See* Jens Winter, Leasing aus institutionenökonomischer Sicht (Gabler, 2011) at 8.
27 *See* Göbel, *supra* note 17, at 103.
28 *See* Richter & Furubotn, *supra* note 22, at 592.
29 *See* Fritsch, *supra* note 19, at 262–263.
30 *See* Göbel, *supra* note 17, at 118.

not only needs to be available, it also needs to be understandable to the recipient. This is a problem in particular when the recipients do not have the corresponding educational background. In the absence of any initiative or suitability with respect to the provision of information by the service provider (agent), then the state can also assume this task.[31]

Both sets of circumstances involving adverse selection based on asymmetrical distribution of information and moral hazard are problem areas confronting a financial market supervisory authority, particularly at times of information overload based on the problem of big data. There is an inherent risk that the supervisory authorities will no longer be able to see the forest through the trees and that the main task of investor protection, at least in the transformation phase, will only be able to be fulfilled to a limited extent.

C. Behavioral Finance

Behavioral economics is a sub-area of economic science. It is concerned with human behavior in economic situations. It involves examination of sets of circumstances in which people act contrary to the model assumption of homo economicus, i.e., the rational utility maximizer. Such questions also continue to be examined by game theory.[32]

With the model of the homo economicus, the neoclassical theory takes into account investor behavior almost completely based on the abstraction of human behavior. However, if we observe the actual operations on the financial markets, then barely any market participant meets its requirements of strict rationality: investors have an information deficit, make mistakes in forming expectations and also at times allow themselves to be guided by irrational motives in their decisions.[33]

The homo economicus is thereby simply an ideal and not a realistic reflection of actual human behavior. According to the neoclassical doctrine, the psychological factors cancel each other out and are irrelevant for market examination purposes.[34] Pursuant to the idea of adverse selection, irrational in-

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31 *See* Fritsch, *supra* note 19, at 278.

32 *See* Vienne Behavioral Economics Network, *Was ist Behavioral Economics?,* https://vben.at/was-ist-behavioral-economics/ (last visited Apr. 15, 2019).

33 *See* Rainer Ellenrieder, Synergetische Kapitalmarktmodelle: Erklärung der Wertpapierkursentwicklung durch Integration des menschlichen Anlegerverhaltens in ein Kapitalmarktmodell (Uhlenbruch Verlag, 2001) at 93.

34 *See* Stefan Wendt, Die Auswirkungen von Corporate Governance auf die Fremdfinanzierungskosten von Unternehmen: Eine empirische Analyse der Folgen von Aktientransaktionen durch Insider (Springer Gabler, 2011) at 36; Esther Merey, Industrie- und Kapitalmarktdynamik: Eine modelltheoretische Wirkungsanalyse auf der Basis von künstlichen neuronalen Netzen (Kovač, 2011).

vestors are eliminated from the market over the long term as a result of the financial losses suffered. According to the neoclassical opinion, professional investors act consistently more or less rationally and can compensate for any errors in price determination via arbitrage. However, systemic distortions have been ascertained in investor behavior using observations from behavioral science.[35]

Building on new institutional economics the neoclassical financial theory approaches are expanded to include behavioral, psychological, and sociological aspects. Behavioral finance now looks for the reasons behind limited rationality and the consequences arising from this for behavior.[36] SupTech can now be an instrument for the financial market supervisory authorities to break through these shortcomings, which have been explained on the basis of behavioral science in this chapter.

IV. Legal and Regulatory Influence

A. General

The hierarchical structure of the legal and regulatory influence on a national supervisory authority is diverse and extensive. Not only are different target groups involved at the global, European, and national levels, the regulations are also partly principle-based and partly rule-based, and there are obviously also hybrid forms.

Principle-based law is characterized by the fact that the regulations require interpretation and are not conclusive. Although the aim of the regulation is stipulated as mandatory, different ways or means of achieving the relevant objective are left to the addressee's discretion. Rule-based law, on the other hand, is strict and limited in its flexibility. As such rule-based law satisfies the maxim: lawmakers' rule, and the supervisory authority applies and executes the law. Rule-based law corresponds with the traditional image of state monitoring and intervention, as the authority's actions should be measured against the statutory regulations in all cases and must be subject to unrestricted judicial control.[37]

SupTech, like all government action, must be embedded in the legal framework of each nation state. Therefore, the different levels of legal influence and their similarities and differences will be briefly explained.

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35 *See id.* 93–94.

36 *See* Wendt, *supra* note 34, at 36 et seq.

37 *See* Manfred Wandt, Prinzipienbasiertes Recht und Verhältnissmässigkeitsgrundsatz im Rahmen von Solvency II, (VVW, 2012) at 8–11.

B. International IOSCO Standards

Since 2011, the Financial Market Authority (FMA) Liechtenstein has been a full member of the International Organization of Securities Commissions (IOSCO[38]) founded in 1983. The organization has around 200 members worldwide.[39]

IOSCO plays the leading role in establishing international standards in the area of securities supervision. It also promotes cooperation between securities supervision authorities. The member authorities exchange information and develop standards aimed at improving supervision over securities trading and market participants both nationally and internationally. The aim is to achieve fair and efficient securities trading that accounts for investors' interests. IOSCO recommendations also frequently shape the law and market structures at the national and EU levels. Active collaboration in all important bodies of IOSCO and asserting the national interests is thus of particular importance. IOSCO recommendations are predominantly principle-based. The reports, standards, and resolutions of IOSCO apply consistently to all IOSCO members. They are enacted by the Presidents Committee, IOSCO's central decision-making body. Reports and recommendations from the Technical Committee or the Emerging Markets Committee are only addressed to those members represented on these committees. These bodies are responsible for actually working on the standards and recommendations.[40]

The IOSCO Objectives and Principles for Securities Regulation are the guiding principles by which the quality of a country's securities commission is measured as part of international assessments. The IOSCO Multilateral Memorandum (MMoU) also represents the international standard for cooperation and exchange of information in the area of securities supervision. Fulfilling these standards is a prerequisite for becoming a member of IOSCO.

IOSCO published a final report in 2009 on risk-based supervision entitled Guidelines to Emerging Market Regulators Regarding Requirements for Minimum Entry and Continuous Risk-Based Supervision of Market Intermediaries[41]. The objectives of supervision of the market intermediaries in the securities area are as follows:

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38 *See* International Organization of Securities Commissions (IOSCO), https://www.iosco.org/ (last visited Apr. 15, 2019).

39 *See* Financial Market Authority (FMA) Liechtenstein, https://www.fma-li.li/de/internationales/global/internationale-organisationen.html (last visited Apr. 15, 2019).

40 *See* Federal Financial Supervisory Authority (BaFin) Germany, https://www.bafin.de/DE/Internationales/GlobaleZusammenarbeit/IOSCO/iosco_node.html (last visited Apr. 15, 2019).

41 *See* Emerging Markets Committee of the International Organization of Securities Commissions (IOSCO), *Guidelines to Emerging Market Regulators Regarding Requirements for Minimum Entry and Continuous Risk-Based Supervision of Market Intermediariew* (2009), http://www.iosco.org/library/pubdocs/pdf/IOSCOPD314.pdf (last visited Feb. 3, 2019).

> *«The supervision of market intermediaries has three broad objectives: to protect client assets from insolvency of the intermediary or appropriation by the intermediary or its employees; guard against defaults and sudden disruptions to the market, either through sudden insolvency or settlement failure; and, to ensure that intermediaries are fair and diligent in dealing with their clients. Regulation, therefore, sets licensing standards (limiting the market place to those with sufficient resources and qualification), prudential standards (protecting against sudden financial failure), internal controls and risk management standards (reducing the possibility of default or to appropriate client assets), and business conduct rules (ensuring proper handling of client accounts)»*[42]

The challenge in terms of risk-based supervision is primarily the fact that the data volume has increased continuously over time. In other words, the maps for overview of intermediaries, products and markets are becoming more and more detailed and with higher granularity.

C. European Directives and Directly Applicable Regulations

Multiple bodies work together to create legislation within the European Union: the European Commission, the Council of the European Union and the European Parliament. The Economic and Social Committee and the Committee of the Regions are also consulted in developing legislative acts.[43]

European legislation differs significantly from legislation in the Member States. It is characterized by very lengthy proceedings and many actors. Although the procedures take a very long time, the time frames for influencing the design process are often very short. The lack of development of a European public view has led to a very informal procedure which forces individual interest groups to remain very close to events at all times and pursue their issues very closely. There is therefore an inherent information asymmetry here.

The directives and directly applicable regulations take on an important role in the European Union's legislative procedure, which is why these should be briefly explained further: Directives stipulate an objective and a time frame for its implementation. They must be transposed into national law by the Member States. The Member States are free to determine the means used to do this. If a Directive is not transposed into national law or its adoption is not complete or not within the time frame, European citizens can under certain

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42 *See id.,* at 3.

43 *See* European Union, *Institutions and bodies,* https://europa.eu/european-union/about-eu/institutions-bodies_en (last visited Apr. 15, 2019).

conditions invoke it directly before the national courts.[44] (Directly-applicable) Regulations, on the other hand, apply directly in all European Member States once they have been enacted. They are directly binding for Member States, their authorities and bodies. If a Regulation conflicts with a national law then the Regulation takes precedence. Decisions are addressed to a particular addressee and are directly binding on the latter with respect to all their parts.[45] The stipulations arising from the European directives and directly binding regulations are often rule-based.

In other words, the rules are becoming more and more detailed and concrete. There is a growing lack of discretion for national supervisors. Risk-based and target-group-oriented action is made more difficult because not every size is suitable for everyone and therefore size compatibility suffers.

D. ESMA Guidelines and Recommendations

The European Securities and Markets Authority (ESMA) headquartered in Paris was founded in early 2011. ESMA is generally seen as a successor to the Committee of European Securities Regulators (CESR) but its responsibilities and powers go well beyond those of the CESR. The ESMA is part of the European System of Financial Supervision (ESFS) and is the key institution for the supervision of securities and markets in Europe.[46]

The ESMA's primary objectives include improving investor protection and ensuring the integrity, transparency and efficient functioning of the securities market. Additional important areas of activity include promoting supervisory convergence, creating a Single Rulebook and ensuring direct supervision[47].

The ESMA is authorized to issue guidelines and recommendations[48] on the application of EU law in those areas not covered by the technical regulatory or implementation standards. The Authority should be able to publish the reasons for non-compliance with the guidelines and recommendations by the supervisory authorities in order to guarantee transparency and increased com-

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44 *See* EUR-Lex, *The direct effect of European law,* https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM%3Al14547 (last visited Apr. 15, 2019).

45 *See* EU-Info, *Gesetzgebung,* http://www.eu-info.de/europa/eu-richtlinien-verordnungen/ (last visited Dec. 7, 2018).

46 *See* European Securities and Markets Authority (ESMA), *Who we are,* https://www.esma.europa.eu/about-esma/who-we-are (last visited Apr. 15, 2019).

47 *See* European Securities and Markets Authority (ESMA), *Interactive Single Rulebook* (ISRB), https://www.esma.europa.eu/rules-databases-library/interactive-single-rulebook-isrb (last visited Apr. 15, 2019).

48 *See* European Union, *EU Regulations, Directives and other acts,* https://europa.eu/european-union/eu-law/legal-acts_en (last visited Dec. 18, 2018).

pliance with these guidelines and recommendations by the national supervisory authorities. The guidelines and recommendations often involve a hybrid form of principle-based and rule-based regulations. In other words, the need for a level playing field results in the fact that overly detailed requirements and rules can sometimes contradict each other and (smart) supervision becomes increasingly difficult.

V. Application Areas and Risks of SupTech

A. Introduction and Risk Assessment

The application areas for SupTech can be divided into data collection, data analysis, and data exchange. In addition to the application areas described below, the risks of SupTech should not be ignored. Specifically, the huge data retention harbors risks related both to cyber security and to the fact that the flood of information itself means that the supervisory authorities have a major responsibility in terms of analysis and assessment. As long as the relevant information was not available, the supervisory authority could denounce this behavior as being the responsibility of the intermediary to provide.

However, supervisory authorities now have large amounts of data (big data) and have a responsibility within the framework of supervision (see for a better understanding the above sections III/IV) to implement risk-based data assessments and to sanction in case of breaches of supervisory rules within the scope of enforcement in order to achieve the supervisory authority objectives of: guaranteeing the stability of the financial market, protecting customers, avoiding abuses and implementing and complying with recognized international standards. Yet, risk-based also means assuming responsibility for the selection decision, a decision that must be supported as part of the supervisory strategy—not by the executive management, but also by the supervisory board as the supreme body.

B. Data collection

New data collection mechanisms are at the core of the emerging paradigm shift in financial supervision. Technology fuels the development of sophisticated and data-intensive approaches to supervision[49]. SupTech applications support the data management (registration and monitoring) as well as the reporting processes (reporting) at the authority. In the field of reporting, applica-

49 *See* Toronto Centre, *supra* note 8, at 10–12; Bank for International Settlements, *supra* note 11.

tions include forms of automated reporting as well as real-time monitoring. SupTech will likely lead to an upsurge in reporting utilities, i.e., specialized companies set up to collect and process raw data from institutes for the purpose of supplying the data to the financial market authority. Closely related to this push-approach is the pull-approach. In the latter, the authority obtains data directly from the IT-systems of institutions with the frequency that suits the needs of the supervisor. Direct data exchange will make templated reports obsolete and increase efficiency throughout the process by reducing manual data handling, human error and validation iterations. Real-time monitoring is the closest form of monitoring. By linking directly to the market places the financial market authority is able to collect data at its root. Real-time systems provide alerts about anomalies observed in the markets which trigger subsequent investigations.

All forms of data collection have in common that their reporting is automated and covers all relevant data without having a negative impact on the financial intermediaries' day-to-day business. Reporting includes event-related reporting as well as regular reporting and reports on financial and supervisory information.

C. Data analytics

SupTech will enable real-time supervision thanks to smart supervision. The collection of (almost) real-time data that is not constrained by formatted templates gives supervisors additional flexibility to extract those pieces of information that are most relevant from a risk-based perspective and to generate customized indicators and reports at any time.[50] The data is analyzed on a continuous basis and presented in the supervisory authorities' Supervision Cockpit using a Risk Map (analyzing and monitoring). A data analysis using self-learning artificial intelligence ensures that the supervision can also be completed using objective criteria and that subjective artificial distortions do not result in unequal treatment. Smart supervision can also—building on aggregate data—enable the system to propose core areas for ongoing supervision, linking reporting data with current market and company data. Furthermore, SupTech will enable supervisory authorities to shift increasingly from continuous monitoring to exception-based supervision, in which automated analyses identify outliers or abnormal situations either on institute-level or on sector level.

The ultimate goal of SupTech will be the paradigm shift towards a predictive data-driven supervision that uses the available information not only to

50 *See* Toronto Centre, *supra* note 5, at 7–10; Bank for International Settlements, *supra* note 11.

identify breaches in the past but to predict behavior or risky situations in the future and thus put the supervisory authority in a position to act ahead of time in a preemptive manner.

D. Data exchange

Transaction data, either based on transactions in financial instruments in accordance with MiFIR or OTC transactions in accordance with EMIR are made available directly to the financial market supervisory authorities. This data must of course be linked with the aggregated data from the past and included in the assessment. It is not only the national supervisory authorities that should have access to this data but also the supervisory authorities of the counterparty included via memorandum of understanding if more information is required in the context of enforcement measures. Additional supervisory data can be provided as part of consolidated supervision or within the framework of a review of a higher-level supervisory authority (e.g., ESMA). The tax law data and exchange of this must naturally be kept strictly separate from the national, European and international data exchange (IOSCO Multilateral Memorandum of Understanding).

VI. Appraisal and Epilogue

SupTech is a buzzword today that needs to be brought to life in daily supervisory practice. Several supervisory authorities are currently, *literally,* trying the find a needle in a haystack with their risk-based supervision.

SupTech will change the job description of the traditional supervisor in the financial market area. *Richard* and *Daniel Susskind* have summarized these effects, that the supervisory authorities will equally be unable to avoid, as follows:

> *«Our personal and working lives will continue to be overhauled by technology, including even more powerful processing power; artificial intelligence that can discern patterns, identify trends and make accurate predictions once reserved to humans; a cloud that offers seemingly limitless cheap storage capacity; lightning quick communications; ever greater miniaturization; and rapid decline in the cost of components.*
>
> *New capabilities are emerging on an apparently daily basis, and what is striking about most of these systems is that they could not have been delivered 5 years ago because we did not have the technological wherewithal: the mobile platforms, the bandwidth, the software and more.*

> *There are 6 billion mobile subscribers around the world, of which 2 billion are smart phone users, and this number is expected to double by 2020. When 3 billion people are connected, they communicate and research very differently; they also socialize, share, build communities, cooperate, crowd-source, compete and trade in ways and on a scale that has no analogous in the analogue world.»*[51]

In the prologue, we introduced the problem of a one-to-one scale map. At the initial stages of cartography world maps were drawn with unknown regions simply omitted. The maps had no white spots and gave the impression that they included all information. Big data gives the impression that all data is available and that we know the reality. It was only in the 15th and 16th centuries that people had the courage to provide white spots on world maps. Things for which it was known that nothing was known. People consciously accepted the gaps they had and focused on what they knew and also needed.[52] People de facto took a risk-based approach.

Not only smart regulation, but also a subsequent smart supervision is therefore a necessary consequence of SupTech that is only feasible using the latter. Only risk-based supervision, the acceptance of gaps, and assumption of responsibility in this regard brings us closer to the objectives and responsibilities imposed upon us as (therefore smart) supervisory authorities. And in the same way as the white spots aroused the scientific curiosity and encouraged expeditions and the risk of black swans occurs,[53] only continuous (re)evaluation of risk-based supervision will bring supervisory authorities closer to achieving their objectives, whether at the national, European or international levels. Otherwise supervisory authorities will be subject to the erroneous belief and the fallacy that only more information automatically results in better decisions.[54]

The supervisory authority's aim is not to achieve the perfect one-to-one scale map as a depiction of reality, but rather to achieve a hazard and risk map that ensures that it is properly armed for the situation and can draw the right conclusions and implement the appropriate actions. Knowledge is power, as the saying goes, but too much knowledge always leads to powerlessness. All efforts will fail in the event of information overload as the supervisory authorities are subject to information bias and *Bonini's* paradox. This are the reasons

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51 Richard Susskind & Daniel Susskind, The Future of the Professions (Oxford University Press, 2017) at 6.

52 *See* also Yuval Noah Harari, Eine kurze Geschichte der Menschheit (Dva, 2013) at 349–365.

53 *See* Nassim Nicholas Taleb, The Black Swan (2nd ed. Penguin, 2012) at 105–107; Dobelli, Rolf, Die Kunst des klugen Handelns (15th ed., Hanser, 2017) at 105–107; Bank for International Settlements, *supra* note 11.

54 *See* Dobelli, *supra* note 33, at 33–35.

why only accurate and specific information in the sense of smart (and better) regulation[55] also results in effective and efficient actions on the part of a supervisory authority (so called smart supervision). One thing is clear; SupTech's influence will change the approach of financial market regulators and transform it in the sense of positive destruction.[56]

VII. Bibliography

A. Hard Copy Sources

Bonini, Charles P, Simulation of information and decision systems in the firm (Literary Licensing, 1963).

Caroll, Lewis, Sylvie and Bruno Concluded (Ray Dyer Ed., 2015) (1893).

Dobelli, Rolf, Die Kunst des Klugen Handelns [The Art Of Smart Action] (15th ed., Hanser, 2017).

Ellenrieder, Rainer, Synergetische Kapitalmarktmodelle: Erklärung der Wertpapierkursentwicklung durch Integration des menschlichen Anlegerverhaltens in ein Kapitalmarktmodell [Synergetic capital market models: explanation of security price development through integration of human investor behavior in a capital market model] (Uhlenbruch Verlag, 2001).

Michael Fritsch, Marktversagen und Wirtschaftspolitik: Mikroökonomische Grundlagen staatlichen Handelns [Market failure and economic policy: microeconomic principles of state action] (8th ed., Vahlen, 2011).

Göbel, Elisabeth, Neue Institutionenökonomik: Konzeption und betriebswirtschaftliche Anwendungen [New institutional economics: concept and economic applications] (UTB, 2002).

Harari, Yuval Noah, Eine kurze Geschichte der Menschheit [A Brief History of Humankind] (Dva, 2013).

Lötscher, Marcel, Die vermögende Privatperson als qualifizierter Anleger [The wealthy private individual as a qualified investor] (Tectum Verlag, 2014).

Merey, Esther, Industrie- und Kapitalmarktdynamik: Eine modelltheoretische Wirkungsanalyse auf der Basis von künstlichen neuronalen Netzen [Industria and Capital Market Dynamic: A Moral Theoretical Impact Analysis on the Basis of Artificial Neural Networks] (Kovač, 2011).

Posner, Richard A, *Recht und Ökonomie: Eine Einführung (Law and economics: an introduction)* 90 *in* Ökonomische Analyse des Rechts [Economic analysis of law] (Heinz-Dieter Assmann et al., 1993).

Priddat, Birger P, Strukturierter Individualismus: Institutionen als ökonomische Theorie [Structured individualism: institutions as economic theory] (Metropolis Verlag, 2005).

Richter, Rudolf & Furubotn, Eirik G, Neue Institutionenökonomik: Eine Einführung und kritische Würdigung [New institutional economics: an introduction and critical assessment] (4th ed., Mohr Siebeck, 2010).

55 *See* European Commission, *Better Regulation Toolbox based on the Better Regulation Guidelines* (2015), http://ec.europa.eu/smart-regulation/guidelines/docs/swd_br_guidelines_en.pdf (last visited Dec. 23, 2018).

56 *See* Joseph A Schumpeter, Kapitalismus, Sozialismus und Demokratie (UTB, 1993) at 132–142.

Schuhr, Jan C, Rechtsdogmatik als Wissenschaft: rechtliche Theorien und Modelle [Legal doctrine as science: legal theories and models] (Duncker & Humblot, 2006).

Schumpeter, Joseph A, Kapitalismus, Sozialismus und Demokratie [Capitalism, Socialism and Democracy] (UTB, 1993).

Susskind, Richard & Susskind, Daniel, The Future of the Professions (Oxford University Press, 2017).

Taleb, Nassim Nicholas, The Black Swan (2nd ed. Penguin, 2012) at 105–107.

Vaughan, Michael, The Thinking Effect: Rethinking Thinking to Create Great Leaders and the New Value Worker (Nicholas Brealey Publishing, 2012).

Wandt, Manfred, Prinzipienbasiertes Recht und Verhältnissmässigkeitsgrundsatz im Rahmen von Solvency II [Principle-based law and proportionality within the scope of Solvency II] (VVW, 2012).

Wendt, Stefan, Die Auswirkungen von Corporate Governance auf die Fremdfinanzierungskosten von Unternehmen: Eine empirische Analyse der Folgen von Aktientransaktionen durch Insider [The impact of corporate governance on company borrowing costs: an empirical analysis of the consequences of share transactions by insiders] (Springer Gabler, 2011).

Winter, Jens, Leasing aus institutionenökonomischer Sicht [Leasing from an institution economic perspective] (Gabler, 2011).

B. Online Sources

Barile, Margherita, *Bijective*, MathWorld (Dec. 18, 2018 10:00 AM), http://mathworld.wolfram.com/Bijective.html (last visited Feb. 1, 2019).

Broeders, Dirk & Prenio, Jermy, *Innovative technology in financial supervision (suptech)—the experience of early users,* Bank for International Settlements—FS Insights on policy implementation No. 9 (2018), https://www.bis.org/fsi/publ/insights9.pdf (last visited Feb. 3, 2019).

Emerging Markets Committee of the International Organization of Securities Commissions (IOSCO), *Guidelines to Emerging Market Regulators Regarding Requirements for Minimum Entry and Continuous Risk-Based Supervision of Market Intermediaries* (2009), http://www.iosco.org/library/pubdocs/pdf/IOSCOPD314.pdf (last visited Feb. 3, 2019).

EU-Info, *Gesetzgebung*, http://www.eu-info.de/europa/eu-richtlinien-verordnungen/ (last visited Dec. 7, 2018).

EUR-Lex, *The direct effect of European law,* https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM%3Al14547 (last visited Apr. 15, 2019).

European Commission, *Better Regulation Toolbox based on the Better Regulation Guidelines* (2015), http://ec.europa.eu/smart-regulation/guidelines/docs/swd_br_guidelines_en.pdf (last visited Dec. 23, 2018).

European Securities and Markets Authority (ESMA); *Interactive Single Rulebook* (ISRB), https://www.esma.europa.eu/rules-databases-library/interactive-single-rulebook-isrb (last visited Apr. 15, 2019).

European Securities and Markets Authority (ESMA); *Who we are,* https://www.esma.europa.eu/about-esma/who-we-are (last visited Apr. 15, 2019).

European Union, EU *Regulations, Directives and other acts,* https://europa.eu/european-union/eu-law/legal-acts_en (last visited Dec. 18, 2018).

European Union, *Institutions and bodies,* https://europa.eu/european-union/about-eu/institutions-bodies_en (last visited Apr. 15, 2019).

Federal Financial Supervisory Authority (BaFin), https://www.bafin.de/DE/Internationales/Globale-Zusammenarbeit/IOSCO/iosco_node.html (last visited Apr. 15, 2019).

Financial Market Authority (FMA) Liechtenstein, https://www.fma-li.li/de/internationales/global/internationale-organisationen.html (last visited Apr. 15, 2019).

Gabler Wirtschaftslexikon, *Neue Institutionenökonomik,* https://wirtschaftslexikon.gabler.de/definition/neue-institutionenoekonomik-38077 (last visited Apr. 15, 2019).

International Organization of Securities Commissions (IOSCO), https://www.iosco.org/ (last visited Apr. 15, 2019).

Toronto Centre, *FinTech, RegTech and SupTech: What They Mean for Financial Supervision* (2017), https://res.torontocentre.org/guidedocs/FinTech%20RegTech%20and%20SupTech%20-%20What%20They%20Mean%20for%20Financial%20Supervision.pdf (last visited Feb. 3, 2019).

University of Portsmouth European Studies, *Direct applicability and direct effect*, http://hum.port.ac.uk/europeanstudieshub/learning/module-3-governance-in-a-multi-level-europe/direct-effect-and-direct-applicability (last visited Dec. 18, 2018).

Vienne Behavioral Economics Network, *Was ist Behavioral Economics?*, https://vben.at/was-ist-behavioral-economics/ (last visited Apr. 15, 2019).