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Norm Emergence in Regulatory Compliance

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Abstract.
A trend in regulatory compliance is to issue 'open norms': norms which leave room for contextual interpretation about their implementation. Subjects must demonstrate to the regulator how they have interpreted the norms and collect evidence to show that the implementation is operationally effective. Subjects communicate frequently about the interpretation of open norms and copy compliance behaviour of others. We view this social norm interpretation process as a form of *norm emergence*. We have performed a case study of adoption of AEO (Authorized Economic Operator) legislation in the EU customs domain. We make two observations: (1) norm adoption is guided in a top-down fashion, by EU guidelines and auditing standards, (2) consensus about what counts as acceptable is reached by interaction among companies, consultants, and auditors. In this paper we review of some literature about norm emergence in the multi agent systems field, which can explain these observations. It turns out that we need to combine two kinds of theories: (i) theories about the specification, prescription and implementation of norms (one-to-many, top-down), and (ii) theories about norm adoption, consensus reaching and norm distribution (many-to-many, bottom-up).

1 INTRODUCTION

A trend in regulatory compliance is to formulate legislation as open norms that leave room for contextual interpretation about their implementation. Open norms do not describe in detail what is permissible or prohibited; they indicate what behaviour is expected by abstract principles or general objectives. For example, a recipe may prescribe to add salt "according to taste". How much salt must be added depends on the cook and his guests. Through experience a cook learns what reasonable quantities of salt are appropriate for different kinds of dishes.

In this work, we discuss the emergence of norms in human practice. We consider two types of agents: agents that implement norms (subjects) and agents that audit norm compliance (regulators). Open norms assume that subjects are able to interpret and implement legislation appropriately [2][3]. Whereas rule-based norms are quite straightforward to implement and require little interpretation, open norms need to be tailored to an agent's specific situation. Furthermore, open norms need to be translated into concrete constraints or rules before they can be implemented in IT systems [11]. From the regulator's perspective open norms also require a different approach to norm enforcement. Compliance with rules can be simply checked; compliance with principles or general objectives requires interpretation of norms and an evaluation of the implementation in a certain context. The regulator thus needs to get an insight in how and why a company has implemented principles or general objectives as certain rules in its business processes to determine compliance [3]. Even though the norms are adapted to the unique circumstances of an agent, norm compliance has to be enforced in a fair and consistent way. Regulators can therefore also learn from best practices developed in the field, and use them as benchmarks to evaluate future implementations of open norms.

When legislation is relatively new, both types of agents may lack experience and knowledge to work with the norms. Subjects need examples of appropriate norm implementations from regulators. Regulators on the other hand, need input from the field to determine fair evaluation criteria to assess norm implementation. Regulators are thus awaiting experiences from the field, and the agents are awaiting implementation guidance and criteria. To overcome this potential deadlock situation, we need to understand the emergence of norms to be able to accelerate both of these learning processes. Understanding these processes is relevant for research in social simulation [12] and also for the specification of normative multi-agent systems with certain desirable properties.

Current research in multi agent systems (MAS) addresses norm evolution and adoption either as norm emergence (bottom-up) or norm prescription (top-down)[12]. We argue that an integrated approach is needed to study norm emergence more realistically: bottom up processes are likely to be bounded by law(s) and top down processes may be influenced by bottom-up forces. Especially for compliance with open norms, where implementations are instantiations of open norms (top-down), but where consensus emerges about how little or how much compliance effort is considered acceptable (bottom-up), it is important to address both processes simultaneously.

In this paper report on an extensive case study about the adoption of new legislation regarding Authorized Economic Operators (AEO), see [2][3]. AEO legislation aims to secure the supply-chain while reducing the administrative burden for companies. Companies may apply for an AEO certificate, when they can demonstrate to be trustworthy to customs concerning safety and security in the supply chain. The EU requirements for an AEO certificate are relatively general and abstract, so they form a nice example of open norms. Companies must identify risks and determine control measures to comply with the legislation. Customs must evaluate whether the control measures are sufficient given the risks. In the case study, we study what norm emergence processes take place in the interaction between customs and companies. We identify which aspects of the case study are covered by the literature and could be used as a basis for an integrated model on norm emergence.

The remainder of the paper is organized as follows. First, we describe processes of norm emergence encountered in the case study. In Section 3 we discuss a selection of literature on norm emergence. Next, we discuss if the literature explains the findings of our case study and identify blank spots. Section 5 presents our conclusions and provides directions for future work.

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2 CASE STUDY: CUSTOMS REGULATION

The case study is a form of qualitative empirical research about the adoption and enforcement of legislation in practice, namely the Authorised Economic Operators (AEO) legislation [7, 8]. In previous work we have reported on the same case study [3]. Here we focus on the emergence of norms in the interaction among customs agencies (regulator) and companies (subjects), who are guided in some cases by advice from legal consultants. In particular, we study the emergence, standardization and spreading of various implementations of open norms among companies, as well as the consensus building about the acceptability of those implementations among customs' auditors in different regions and between auditors and companies.

2.1 Data Collection

Data for this case study was collected by the following methods: document analysis, semi-structured interviews and observation. We studied internal and public documents from the Dutch tax and customs administration (Dutch TCA) and a petrochemical company (PCC), which recently applied for the AEO certificate. We conducted five interviews with auditors of Dutch TCA about PCC's application, and joined Dutch TCA auditors on two visits to PCC. We also studied PCC's AEO application documents. Except for the visits, we tape-recorded all interviews with the participants' prior agreement. Minutes were made of meetings.

2.2 Norm emergence in the AEO case

Recently, new European customs legislation has been introduced to enhance the security of the international supply chain. The legislation introduces certificates for so called Authorized Economic Operators (AEO). The idea is that security can be increased through a combined effort of business and government. Companies that can be trusted, i.e. meet the requirements to receive an AEO certificate, benefit from reduced customs inspections, simplified procedures and therefore a reduced administrative burden. Customs can focus their attention on non-certified companies. At the European level guidelines have been defined that leave room for local implementations. National customs' agencies are free to develop their own control strategies within the European legislation [10]. Therefore these EU guidelines can be characterized as open norms. Based on the EU guidelines, customs specify evaluation criteria for audits; companies on the other hand interpret the guidelines as rules for implementations, and produce context dependent instantiations.

A company may qualify as AEO, when it can demonstrate to have (i) an appropriate record of compliance concerning tax and customs issues, (ii) a satisfactory system of managing commercial, and where appropriate, transport records, which allows appropriate customs controls, (iii) proven financial solvency and (iv) appropriate safety and security standards [7,8].

The implementation of the open AEO guidelines is a struggle for both customs and companies. Customs have to decide which implementations conform to the open norms and may serve as benchmarks for the field. Since the legislation is relatively new, there are no best practices or guidelines for implementation. This is true in particular for guideline (iv) about safety and security. The knowledge of customs auditors about this topic is often tacit and therefore difficult to share. Moreover, the implementation of the AEO guidelines requires domain specific knowledge to translate the open norms into company or industry specific solutions. For example, security risks in the scrap metal industry are of a completely different nature than risks in the pharmaceutical industry and therefore require a different set of security measures. Customs are able to recognize most risks but often lack the knowledge to come up with company specific solutions. On the other hand, controllers and the internal audit department of companies have more knowledge about the business and are therefore more capable of doing a risk assessment. So expertise from both customs and companies is needed to instantiate the abstract AEO guidelines with specific procedures, information systems and security measures.

Whereas in some countries customs take the lead in specifying the open norms, Dutch customs aim to do this in cooperation with the business sector. Dutch customs does not prescribe detailed rules for companies but let them propose their own implementations of the open norms. A self-assessment, in which companies need to identify their current position and necessary actions to comply with the legislation, is part of the certification procedure to become AEO. In the Dutch practice, the self-assessment concerning guideline (iv), about safety and security, must contain a risk assessment performed by the company itself, to identify the particular risks for the company. Given those risks, the company must show which security measures they have chosen to mitigate those risks, and provide evidence that these measures are operationally effective.

One of the ideas underlying the control approach of Dutch customs is that companies already take actions to control their business processes, for example because of accounting rules or other compliance regulations about health or safety, and that these controls (partially) cover the requirements of the AEO legislation. These existing controls may or may not be accepted by Dutch customs as a sufficient instantiation of the AEO guidelines. Effort is reduced for customs as they get input from the field on contemporary control solutions. Companies, on the other hand, only have to adapt their systems on those points that do not yet conform to the AEO guidelines.

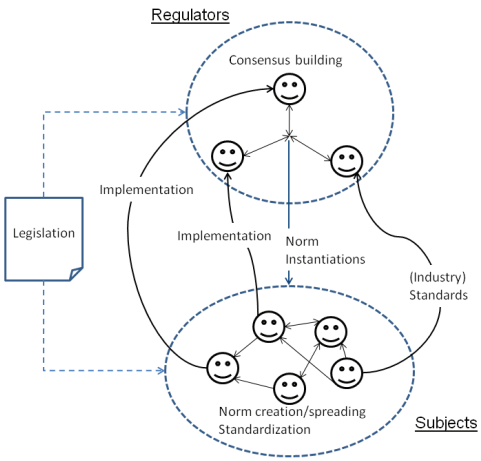

Figure 1. Levels involved in norm emergence

In the AEO case we see that customs and companies together create norms (Figure 1). Norms emerge when companies develop implementations, interact with other companies and agree on industry standards. These implementations and standards are then proposed to customs. Customs guide the norm emergence process by approving or disapproving the proposed implementations as instantiations of the open norms. Different regional offices of the customs organization also have to agree which implementations are acceptable. Approved implementations may function as benchmarks for future audits, or for future implementations of the guidelines [9].

Interviews with customs officials and companies revealed some concrete examples of norm emergence in the AEO case:

1. Implementation of appropriate safety and security measures is a requirement for the AEO certificate [7]. Examples of best practices in transport security are ISO/PAS:28000 and ISPS (International Ship and Port Facility Security Code). Companies often have limited or no security knowledge. Security officers from companies often rely on technical experts employed by vendors of security solutions, such as electronic key systems, RFID solutions and tracking and tracing capabilities. So vendors influence the emergence of new technologies and their adoption as best practices.

   On the other hand we see that companies tend to imitate the behaviour of their competitors, and do not want to invest more money in security than necessary. Security is not a competitive advantage. Typically, in security *"a fence should not be lower than that of the nearest neighbours"*.
2. One of the criteria to become AEO is to have a satisfactory system of managing commercial and, where appropriate, transport records, which allows appropriate customs controls [7]. Customs procedures affect various departments of a company (financial, transport, operations etc.) and information is therefore often scattered over several business systems. Since customs operations are a small part of the business (PCC had only two customs employees) and outsourced companies are not willing to invest in specialized customs software packages, it is hard to collect the data. An intermediate solution to reduce the workload for companies is to provide customs with an overview of how the information is scattered over different business systems instead of creating a new system that contains all the information.
3. As we stated above, a risk assessment in which companies identify their exposure of potential violations has become an official part of the Dutch AEO certification procedure [8]. Companies report the findings to customs and have to explain how the measures they have taken address the risks.
4. Open norms may result in various interpretations. For example, AEO legislation requires that companies have appropriate measures in place to prevent "tampering with cargo units'' (article 14 k) [7]. Companies can for example implement security seals on containers, or instead hire trusted transport companies, recruiting well-trained personnel. Customs assess whether these implementations comply with the norm. Companies in turn can demand explanation why a company is not AEO eligible. In case of a negative decision, a more elaborate explanation is needed for open norms than for rule-based norms, for which the decision is clear. Over time, public evidence about positive or negative decisions will to consensus about what is considered an appropriate implementation of an open norm, c.f. [9].

3 THEORIES OF NORM EMERGENCE

In the case study we observe that norms emerge through discussions about compliance between and among companies and regulators. This is a different process from the usual top-down norm specification and organizational implementation, as we find it in legal sources, work on compliance [11] and also in work on electronic institutions, e.g. [1][6][14]. Such frameworks assume that norms lead to the adoption certain goals, or control objectives, which are subsequently turned into constraints on actions or control measures. But here ideas on norm implementation can originate bottom-up from the subjects who like to comply. For example, in the case study we observe that companies copy security measures from competitors. On the other hand, the process is also different from the process of emergence of social norms or conventions, as we find it in work about social networks or emergence of social conventions [12]. Unlike such frameworks, which allow basically any behaviour to emerge as a norm, here the emergent norms are constrained by a related abstract norm specified by an institution. We therefore study some representative examples of different kinds of research in these areas, and formulate hypotheses to make the prediction of the theories more concrete. The hypotheses can then be compared to the findings in the case study.

3.1 Social mechanisms of norm emergence

Savarimuthu and Cranefield [12] provide an overview of recent work on distributed normative behaviour in simulation studies. The distributed approach focuses on the bottom-up emergence and spreading of norms in a system. For social norms they propose a norm-life cycle model that consists of four phases: (1) norm creation, (2) norm spreading, (3) norm enforcement and (4) norm emergence. They consider two variants of norm emergence: (i) the spreading of a norm in an agent society, until the norm is recognized and followed by most agents, and (ii) bottom-up creation of norms by cognitive agents. Such agents derive a 'proposed norm' based on their cognitive ability or come up with an alternative norm (creation phase) and then help in the emergence of that norm (emergence phase).

For each of the phases of the norm-life cycle model, they present an overview of the mechanisms which are found in norm simulation research. The mechanisms fall into the following categories: social power (punishment, leadership), learning (machine learning, imitation), reputation, off-line design, cognitive, emotion-based, dynamic and static social network typologies, and cultural and evolutional aspects.

Hypothesis 1 (life-cycle): We expect to find behaviour corresponding to the phases (1) norm creation, (2) norm spreading, and (3) norm enforcement.

Hypothesis 2 (mechanisms): We expect to find norm emergence to be enhanced by mechanisms, such as social power, reputation and imitation, and we expect it to be dependent on the agent's position in the social network typology.

3.2 Emergence and immergence.

As has been mentioned in [12], actions of individual agents influence the evolution of norms in a society and on the other hand, norms in a society affect individual agents. Conte et al [4]

describe these processes and the micro- macro link, in more detail. They define emergence as the generation of macro social properties by micro-social behaviour. Individual agents intentionally or unintentionally produce effects by creating the conditions for them to arise. Conte et al. also describe the down-ward causation in which an emergent, macro-social property generates effects at the lower level agents. Down-ward causation occurs in two ways: by a simple and a complex feedback loop.

In the simple loop the emergent effect retroacts on the lower level by determining a new property of the generating system. A property could be for example increased negotiation power in a dependence network. In the complex loop, the emergent effect determines new properties by means of which the effect is reproduced again, which includes two sub processes: immergence and second order emergence.

"Immergence is the process by means of which the emergent effect modifies the way of functioning of the generating system, affecting its generating rules or mechanisms in such a way that it is likelier to be reproduced.

Second order emergence (or incorporation) is the process by means of which an emergent effect is recognised by the producing systems and by this means, the effect is likelier to be reproduced" [4].

Hypothesis 3 (Emergence and immergence): We expect to find (i) macro behaviour, induced by micro decisions, and (ii) adaptation of micro behaviour as a result of macro effects.

3.3 Instantiating and implementing open norms

The body of research on the instantiation and implementation of open norms in MAS is limited. Dignum [6] observes that norms in regulations are (on purpose) specified at a high abstraction level to account for many different situations which may occur over time. Regulations are specified on a higher abstraction level than the level on which the processes and structure of the institution are specified. Norms thus need to be translated and adapted to a certain domain before they can be implemented. The paper discusses different levels of abstraction. Institutions are considered to have a predefined objective and a set of values that direct towards fulfilling that objective. Attached to each value is a list of norms that contribute to that value. *"Norms contribute to a value if fulfilling the norm always leads to states in which the value is more fully accomplished than the states where the norm is not fulfilled"*[6]. The set of norms as a whole 'defines' the meaning of the value in the context of the institution. The behaviour of agents who operate in the institution must be in line with the objectives, values and norms defined by the institution. In order to check norm compliance and act on possible violations, the abstract norms have to be translated into concrete specifications of behaviour. "*Concrete norms pertain to actions that are described in terms of the ontology of the institution and from which therefore the meaning and effect is known or they pertain to situations that can be checked directly by the institute"*[6]. Based on a categorization of abstractness Dignum indicates how translations can be made between the types of abstract norms and more concrete norms. For the translation from concrete norms to the implementation level, Dignum suggest that for each concrete norm a rule is needed that either specifies part of the norm enforcement procedures of the institution, or specifies triggers that signal a violation of the norm and the expected reaction of the institution.

Aldewereld et al [1] describe the implementation of a norm enforcement mechanism for electronic institutions that is based on detecting violations of norms and reacting to these violations instead of restricting agent behaviour up forehand. The paper proposes to use integrity constraints and dialogical constraints to implement such a mechanism. They point out that the implementation of norms requires an operational semantics. The declarative nature of norms is necessary for reasoning about what is considered legal or illegal, while the operational semantics defines how norms are to be implemented, i.e. what to do when norms are in fact violated. Norms that are described in abstract terms, first need to be 'contextualised' before they can be implemented. This contextualisation consists of two steps: (1) interpret the abstract concepts of the norm and link them to concrete concepts used in the institution, using counts-as operators, and (2) adding procedural information and artefacts to the institution to allow enforcement of the norm.

In [14] the operationalization of institutional norms in MAS is discussed in more detail. Norms are categorized depending on the actors involved, verifiability of states and actions in norm expressions, and temporal aspects. For each aspect guidelines on the implementation of norms are proposed.

Hypothesis 4 (Operationalization): Open norms are interpreted in two steps: (i) abstract concepts are instantiated by concrete objects (counts-as), and (ii) procedural information and enforcement artefacts are added to the institution.

3.4 Integrating social conventions and legal norms

Whereas both the prescriptive and conventional view on norms is researched, they are often studied independently of each other. Catselfranchi and Conte [5] try to establish connections between social conventions and prescriptions and model norms as cognitive objects. Their hypothesis is that the emergence of norms is intertwined with the emergence of normative beliefs. Unlike the conventionalists who see norm emergence as a process of agents imitating observable behaviour of other agents, they see emergence as a non-continuous phenomenon. A social norm is seen to imply a belief that a given behaviour is generally prescribed within an (agent) community. This behaviour is executed because and as long as it is believed to be obliged. The consequence of conforming to a given conduct – believed to be prescribed – promotes the act of prescribing it, thus contributing to its spreading.

Hypothesis 5 (Normative beliefs): Norm emergence co-occurs with the creation of a normative belief in a community, i.e. a convention that the norm is generally going to be followed.

4 RESULTS

In the case study we identified four concrete examples of norm emergence that take place in the adoption of European customs legislation about AEO. We observed: 1. The influence of vendors and imitation behaviour in security standards, 2. the development of individual solutions to comply with administrative requirements, 4. risk assessment as a means to justify chosen implementations to customs, and 5. discussions between customs and companies on the appropriateness of implementations of open norms.

We reviewed a selection of literature from the multi agent systems field to assess if current studies are able to explain the phenomena encountered in the case study. We grouped the literature into four topics: 1 Social mechanisms of norm emergence, 2 Emergence and immergence, 3 Instantiation and implementation of open norms and 4 Integrating social conventions and norms. We formulated five hypothesises based on the literature. An overview of the case study findings with regard to the hypotheses is presented in Table 1 below.

Hypothesis	Source	Confirmed	Case study findings
1. Life-cycle	[12]	yes	- spreading: security standards are distributed by vendors or by imitation -creation: intermediate solution to enable customs' administrative controls - enforcement: customs (dis)approving norm implementations
2. Mechanisms	[12]	yes	- social power: customs (dis)approving norm implementations - reputation: hiring security specialists, relying on standards - imitation: fence as high as nearest neighbours - topology: applying industry specific solutions
3. Emergence and immergence	[4]	yes	-approved solutions (jurisprudence) define boundaries for interpreting open AEO norms - AEO norms put requirements on administrative organization
4. Operationali-zation	[1] [6] [14]	yes	-Access controls are instantiations of "appropriate measures" -Security seals that prevent tampering are attached to containers
5. Normative beliefs	[5]	yes	- (Additional) measures need to be implemented by a company if a risk assessment indicates that they are not compliant with AEO legislation

Table 1: Overview of hypothesises and case study findings

We will now discuss the case study findings with regard to each of the hypotheses.

Hypothesis 1 (life-cycle): We expect to find behaviour corresponding to the phases (1) norm creation, (2) norm spreading, and (3) norm enforcement.

In the case study we identified behaviour corresponding to all three phases. An example of norm creation is the intermediate solution of enabling customs to perform administrative controls, by collecting data from existing administrative software, instead of having to implement an integrated compliance system. Forms of norm spreading can be recognized in the distribution of security standards, by the influence of technology vendors (star topology) or by imitation (peer to peer). Norm enforcement by approving or disapproving certain solutions is the main task of Dutch customs. We can thus confirm Hypothesis 1. This entails that to built more realistic regulated MAS applications all phases should be taken into account.

Hypothesis 2 (mechanisms): We expect to find norm emergence to be enhanced by mechanisms, such as social power, reputation and imitation, and we expect it to be dependent on the agent's position in the social network typology.

We observed that customs, through their statutory power of approving or disapproving implementations can accelerate or slow down the emergence and spreading of certain solutions. Companies are more likely to choose approved implementations when they want to apply for AEO. They indicated in interviews to be interested in concrete advice from Dutch customs. Reputation-based mechanisms we encountered in the hiring of so security specialists, and the reliance on standards. Solutions proposed by well-known security vendors or standardization organizations are favoured over developing solutions internally. Mechanisms of imitation are found in the copying of security solutions of competitors, summarized by the quote about neighbours' fence height. The effect of the network topology can be found in branch organizations promoting industry specific solutions. A branch organization, a popular vendor, or a dominant company in the market will typically be found in the centre of a star topology. The different mechanisms defined in the hypothesis are thus observed. Insights from these studies can be used to identify agents in the environment that play a key role in (the acceleration of) norm emergence. An interesting finding is that the regulator can also be a part of a norm emergence mechanism, as enforcer but also as distributor.

Hypothesis 3 (Emergence and immergence): We expect to find (i) macro behaviour, induced by micro decisions, and (ii) adaptation of micro behaviour as a result of macro effects.

Concerning (ii), our case study shows that the AEO legislation imposes clear requirements on the administrative organization of a firm, for instance considering reliability of commercial and transport records, enforced by an internal controls system, segregation of duties, information security measures etc. Concerning (i) we find that jurisprudence in the form of implementations that are known to be accepted or refused as proper instantiations of the AEO guidelines by the customs authorities, will aid in further defining the boundaries of the legislation. For example, if a risk assessment motivates that the risks for a certain industry are lower, requirements for security measures may decrease for that industry. Decisions by individual agents produce macro level effects by creating the conditions for them to arise or be generated [4]. Hypothesis 3 is confirmed.

Hypothesis 4 (Operationalization): Open norms are interpreted in two steps: (i) abstract concepts are instantiated by concrete objects (counts-as), and (ii) procedural information and enforcement artefacts are added to the institution.

The case study confirms the hypothesis, as we observed that conventional measures of physical access control, such as

physical security (walls, gates) and keys or ID passes for identification, authentication and authorization, count as "appropriate measures to prevent tampering with cargo units". So the abstract concept of 'tampering prevention' was translated into the well known object of physical access control, and further refined into the enforcement artefact of security seals, for cargo units. Having to attach a seal onto a container is the addition of a concrete artefact, to enable enforcement of the open norm.

Hypothesis 5 (Normative beliefs): Norm emergence co-occurs with the creation of a normative belief in a community, i.e. a convention that the norm is generally going to be followed.

The case study shows that norms that are required for joining branch organizations or to get certified by standardization organization like ISO are more likely to be followed and thereby copied by other companies. This hypothesis is also confirmed. Mechanisms that motivate compliance (reduced administrative burden) may be developed for MAS to increase norm adherence.

4.1 Discussion

The research reported here has some limitations. In particular, the selection of research that we discussed is limited to normative multi agents systems. We are well aware that there is a lot of relevant other research about emergence (jurisprudence) and enforcement in the legal field, and in the social sciences.

Another limitation concerns the case study. Open norms make sense for safety and security in international trade, because the required security measures are so context dependent. In other areas, such as public health, food safety or fishing quotas, a strict enforcement regime may be more effective. We should not over-generalize findings from a single case.

A final limitation concerns the relevance to multi agent systems. Although 'human' solutions serve as a useful metaphor, artificial social systems may have their own laws.

5 CONCLUSIONS AND FUTURE WORK

In this paper we have present a case study of the adoption of AEO legislation in the Netherlands. The AEO guidelines are an example of open norms: norms of which the implementation is left open to interpretation. The case study demonstrates that in the case of open norms, (1) norm adoption, operationalization and implementation are guided in a top-down fashion, namely by EU guidelines and auditing standards, while (2) also emergence of norms, distribution and consensus reaching among companies, auditors and legal consultants, about the acceptability of implementations, are crucial. However, emergence always takes place within the constraints of the legal framework.

We believe that this dual nature is in fact common to many regulatory processes, including in particular the prescription, adoption and emergence of norms in artificial social systems and electronic institutions. On the one we expect that in such artificial societies, norms will be prescribed. On the other hand, not all behaviour can be described, and in practice, public decisions about what counts as acceptable behaviour will probably function as a boundary for future behaviour.

Which theories can account for this dual nature? We performed a survey of some of the literature in the multiagent systems field about norm emergence, norm specification and norm adoption. First of all, most research about norm emergence studies the distribution of a given norm in a population or over a social network, not its creation. The research on cognitive agents and immergence does address this topic but is limited in their discussion of norm spreading. Second, research about the operationalization and instantiation of open norms only considers the reasoning process of individual agents. There is no account of the consensus building and copying behaviour, found in the case study. This shows that we need to make a combination: individual reasoning by subjects and regulators in order to generate possible interpretations of open norms, enhanced by communication processes to account for social acceptability of those possible interpretations.

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