Towards a Theory of Spontaneous Legal Standardization

Bryan H. Druzin
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ABSTRACT

Long recognized in economics and the literature on standards, network effects occur where the value of a standard increases as the number of other agents using the same standard grows. Each additional user draws in more users, creating a snowball effect that triggers a spontaneous convergence around a particular standard. Spontaneous standardization from network effects abound: railway gauges, computer software, credit cards, videotape standards, time zones, currencies, electrical outlets, screw thread sizes, machine parts are just a few examples. Building upon the concept of network effects, this article posits a theory as to how legal standardization may occur in a decentralized, spontaneous fashion. To this end, the new lex maritima—with its historically transnational character, reliance on custom, increasing use of international arbitration and the highly networked structure of shipping connections—is used to flesh out a general theory of spontaneous legal standardization.

1. INTRODUCTION

The question of whether legal order can evolve in the absence of a central legislative authority is an important one. It is especially relevant given the rising levels of global trade in that these transactions by definition span multiple jurisdictions. Some argue that the primacy of national law is fated to diminish as a new supranational law—the new lex mercatoria—centred on custom, private law and international arbitration emerges.1 If this is true, there is a foundational question here that needs to be answered, one which has not received the attention it deserves. The question is this: without the command of a central authority (or in situations where such authority is feeble) how can a coherent, standardized corpus of law successfully evolve?

* Chinese University of Hong Kong, Faculty of Law. Email: bryandruzin@cuhk.edu.hk. I am grateful to an anonymous reviewer, whose insightful comments greatly improved some aspects of the discussion.

1 The lex mercatoria (from the Latin for ‘merchant law’) was a body of oral and customary commercial law used by merchants throughout Europe during the Medieval period. It is also referred to as the ‘law merchant’, with the medieval law merchant distinguished from its modern analogue. The literature on the law merchant and its modern ‘resurgence’ is large. For a comprehensive list, see fn 1, E Kadens, ‘The Myth of the Customary Law Merchant’ (2012) 90 Tex L Rev 1153. Others, however, remain staunchly sceptical of the concept. See eg ibid.
Without the guiding hand of central direction, what mechanism—if any—can be relied upon to ensure the evolution of a universal and unified body of legal standards?²

This article answers that question. Building upon the concept of network externalities, I put forward a theory as to how legal standardization may occur in a decentralized, spontaneous fashion with specific reference to law of a commercial nature. This, I refer to as spontaneous legal standardization or simply spontaneous standardization.³ The model describes how unified legal standards may gain ascendancy across vast networks of actors without the need for central direction. The implications of the theory are significant in that they augur a possible future where the shadow of national law recedes as it is replaced by a supranational legal order less beholden to the state. The idea offers explanatory power regarding the future development of international law and—while not a topic taken up here—the possible origins of law arising not as a child of government, but rather the precursor to it.

There is some ambiguity in the literature as to what is meant by the *lex mercatoria*.⁴ It often means different things to different people. Its most ambitious definition describes ‘an autonomous legal order, created spontaneously by parties involved in international economic relations and existing independently of national legal orders’.⁵ Other scholars, however, view it in less grand terms as ‘a body of rules sufficient to decide a dispute, operating as an alternative to an otherwise applicable national law’.⁶ Still others consider it as a mere ‘complement to otherwise applicable law, viewed as nothing more than the gradual consolidation of usage and settled expectations in international trade’.⁷ These definitions, however, share a crucial commonality. They deal with—although to different degrees—legal standards whose formulation is beyond the direct control of a single authority.⁸ That being the case, regardless of which understanding of the *lex mercatoria* one adopts, the same question arises: can rule standardization occur without the command of a central authority to do the standardizing? It is not my purpose here to critique or argue for the idea of the modern *lex mercatoria*. This is an entirely different project and I leave

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² The term ‘legal standards’ as it is used here should be understood in a very broad sense as standard contract terms, the less formal commercial practices and norms parties’ agreements often draw upon, as well as the common practices of international arbitration. These standards are foundational to the modern *lex mercatoria* and so form the focus of our discussion. Where these customary practices become relevant to parties’ agreements they will be incorporated into contracts. Also included here are draft rules created by trade associations in that, by and large, ‘soft law’ instruments of this kind simply lend formal expression to commonly used industry practices and norms.

³ I use the terms ‘spontaneous legal standardization’ and ‘spontaneous standardization’ interchangeably throughout.


⁶ Craig and others (n 4).

⁷ ibid.

⁸ Legal standards are ultimately formulated at some point and in that sense all legal standards may be said to be the product of design. The process, however, may be distinguished by at what stage this promulgation occurs. We have in a sense a spectrum that has at one extreme individual actor, at the other formal state law, and everything in between.
that to others. Rather, my aim here is merely to provide a theoretical framework for how legal standardization may occur even where there is no single administrative body clearly in command.

It is difficult—particularly within a short discussion such as this—to map the theory across the vast ocean of legal order that may be said to comprise the modern *lex mercatoria*. That being the case, the discussion looks at a discrete corner of the *lex mercatoria*, the *lex maritima* (maritime law). There are also other reasons to do this. The *lex maritima* with its historically transnational character, incorporation of custom, increasing use of international arbitration, and most crucially, the highly networked structure of shipping connections makes it a logical choice through which to examine the concept of spontaneous legal standardization. It is important, however, to note that the model can also be applied more broadly—the *lex maritima* simply provides a natural illustration of the thesis.

The discussion that follows offers a positive theory of legal standardization, arguing that commercial law will, given the correct conditions, spontaneously standardize as a result of network effect pressures. This is ultimately an empirically testable proposition. However, rather than seek to conclusively prove the theory (an empirically tricky task), my aim is more modest: it is to simply lay out the model, acknowledge its potential limitations, and flesh out the theory using maritime law to see how the model ‘fits’ (as one would hang a picture on the wall or try on a piece of clothing). If the theory proves credible, rigorous empirical work may then be performed going forward. Unfortunately, the constraints of space dictate that only the broad strokes of the theory may be sketched here. It is my hope that theorists can build upon and further explore the framework provided. Indeed, the model allows for a wide breadth of application and such application is enthusiastically invited. One final point: what follows should not be taken as a normative claim for the superiority of bottom-up law over top-down law. The aim of this article is to simply lay the foundations for a positive theory of spontaneous legal standardization—this is not a project of ideology.

The argument proceeds as follows. Section 2 unpacks the concept of network externalities (also referred to as network effects in the literature) and explains how network effects can trigger self-standardization. Utilizing the concept of network effects, Section 3 then articulates a theory of self-standardization. Section 4 discusses legal polycentrism with reference to the proposed model of spontaneous standardization. Section 5 discusses why the *lex maritima* should be particularly susceptible to network effects, suggesting it as a possible case study for future empirical work. Section 6 examines the impact of top-down law on the process of spontaneous standardization with respect to the *lex maritima*. Section 7 discusses some counterarguments and possible complications to the model. Section 8 concludes.

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9 The term *lex maritima* (from the Latin for ‘sea law’) refers to the body of oral rules, customs and usages relating to navigation and maritime commerce. It can be understood as a subsection of the *lex mercatoria*.

10 I use the two terms interchangeably throughout the discussion.

11 Henceforth, the term network effect is used in place of network externalities. The two terms, however, can be used interchangeably.
2. NETWORK EFFECTS AND INCREASING RETURNS EXPLAINED

A network effect is an economics concept that can account for the spontaneous standardization of certain products or services.\(^\text{12}\) It explains how, without central planning, standardization may manifest through the uncoordinated actions of individuals guided merely by their rational self-interest, and yet despite the absence of coordination, universal standards are the unintended outcome of their actions. Network externalities were first discussed by Jeffrey Rohlfs as early as 1974, identifying the phenomenon in the context of telephone systems.\(^\text{13}\) The idea was taken up again in the mid-1980s, with Katz and Shapiro’s foundational work on the subject.\(^\text{14}\) The standard definition of a network effect is as follows: the implicit value of a product or service increases as the number of other agents using the same product or service grows, which in turn draws more users.\(^\text{15}\) Network externalities arise from the need for compatibility.\(^\text{16}\)

How network effects work may be clearer in the context of a simple example. Consider the 20th century relic of the fax machine. The value of a fax machine increases as other people purchase fax machines. This is because each owner of a fax machine has more people to whom they can then fax. Each additional purchase of a fax machine increases the usefulness of a fax machine to every single owner of the product. If there was in fact only one owner of a fax machine, it would have no value. This is because ‘the utility that a given user derives from the good depends upon the number of other users who are in the same “network” . . .’\(^\text{17}\) As more users begin to use the product, its utility grows, attracting more users and on it goes. This generates a positive feedback loop as more users flock to the product. Positive feedback lies at the heart of a network effect.\(^\text{18}\) The dynamic spontaneously reinforces emerging patterns, gradually entrenching these patterns over time. When a market has settled upon a single standard, all competing technologies having left, the market is said to have ‘tipped’.\(^\text{19}\)

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16 Note that I am referring here to what is known as ‘direct’ as opposed to ‘indirect network externalities’. The discussion also takes up the concept of indirect network effects. For a more detailed explanation of the distinction between direct and indirect network effects, see B Druzin, ‘Buying Commercial Law: Choice of Law, Choice of Forum, and Network Externalities’ (2009) 18 Tul J Intl & Comp L 131, 140–44.

17 Katz and Shapiro (n 14).


networked markets are extremely tippy. Given sufficient interaction between users, it is difficult for multiple standards to coexist—a single standard will eventually come to dominate the entire market.

Examples of self-standardization as the result of network effects abound. The paradigm example of a network effect, however, is perhaps language. The value of a language is in allowing direct communication between users. It is, therefore, primed to generate network externalities. The more people who, for example, speak English, the more useful English is to each one of its speakers, creating a positive externality. It is presently estimated that close to a quarter of humanity is conversant in English. Even more interesting though is the sheer speed in which the use of English has spread. The linguistic ascendancy of English as a common language over the 20th century is, I argue, likely attributable in large part to the presence of network externalities. The effect of network externalities on linguistic systems is obvious. As the English language grows in use, so too does its implicit value, triggers further growth. This is a classic network effect.

There are numerous examples of network effects—telephone networks, railway gauges, computer software, credit cards, videotape standards, time zones, currencies, electrical outlets, screw thread sizes, machine parts. It is not necessary to examine more examples as the basic principle is the same in all these cases: the value of the thing in question grows with each additional user because this enhances the user’s ability to synchronize with other users, which in turn draws in more users and ultimately gives rise to a universal standard. Any system possessing the following four criteria will produce network externalities: (i) the utility of the thing in question lies substantially in its ability to allow users to interface with other users; (ii) the standard must be compatible to achieve this end; (iii) agents frequently interact with a relatively large pool of other users (the more frequent the better) thereby creating a high degree of interconnection; and (iv) agents can choose the standards under which they wish to operate. Let us call these the four criteria for spontaneous standardization. If these conditions

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23 The actual number is somewhere around 1.4 billion people, of which roughly 400 million are non-native speakers. CM Millward and M Hayes, *A Biography of the English Language* (Cengage Learning 2011) 342.

24 While other factors such as British colonialism and US military and soft power have no doubt contributed to the linguistic dominance of English, powerful network effects lie at the heart of this linguistic expansion.

25 See n 16, 151.

are present, it is not a question of whether a network effect will arise—a network effect will arise. The question rather is what is the nature of its impact?

3. A MODEL OF SPONTANEOUS LEGAL STANDARDIZATION

From this it is possible to construct a broader theory of self-standardization applied to the legal sphere—spontaneous legal standardization. In a nutshell, the idea is this: legal standards are subject to the influence of network effects comparable to certain products in the marketplace. The ‘market’ for legal standards meets all the criteria for a network effect discussed above. Legal standards facilitate interaction with a larger group. The value of a legal standard as a means to that end thus increases with the number of other people who also subscribe to and employ the same legal standard. Legal standards—particularly transnational commercial legal standards for reasons that will be explained—meet the four criteria for spontaneous standardization outlined above: (i) the usefulness of a legal standard is that it allows those who subscribe to it to successfully interact with other users; (ii) legal standards must be compatible—that is, they must be commonly employed (at the very least, by the two parties involved in the commercial interaction); (iii) commercial legal standards regularly relate to trade across distant regions involving vast numbers of people who frequently interact (indeed, it is the very nature of trade to transcend national and regional boundaries); and (iv) in crafting their contracts, commercial actors can choose the terms that will regulate their interaction.

I have argued elsewhere that the corralling effect of network externalities manifests with respect to choice of law and choice of forum clauses in transnational contracts. However, any regulatory environment that lacks a robust, centralized rule-setting authority and meets the criteria set out above will produce network effects. The field of shipping, as with other realms of transnational law, boast international conventions (eg the Hague Rules, the Hague–Visby Rules, the Hamburg Rules and the Rotterdam Rules). Trade associations, such as BIMCO and INTERTANKO, also draft rules for the sector. However, the power wielded by these ‘authorities’ is nowhere nearly as robust as that of national rule-making bodies in domestic jurisdictions. There is no single, dominant legislative authority with coercive force; rather, there is a loose splattering of authorities mostly lacking enforcement power. Moreover, in the world of shipping, legislative intervention by states has been relatively rare. This makes the lex maritima fertile soil for spontaneous legal standardization (this is taken up again in more detail in Section 5). An important point that should be noted here is that while commercial legal standards meet all the criteria

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28 Druzin (n 16). In the article, I noted some broader applications of the idea: ‘Arguably, the spread of legal norms, business usages, standard terms of contract, rules of arbitration, centres of arbitration, and even entire legal systems—in short, all the elements of the modern law merchant—may be attributed to the effects of network externalities. A case could be made that increasing returns underlie the development of the modern law merchant, as was equally true for its medieval forerunner. This is a compelling topic that invites further study.’ ibid, 137–38 (footnotes omitted). The present article attempts to make good on this promise of further study, fleshing out a model for spontaneous legal standardization.
above, this is not the case with non-commercial areas of law—particularly, the third and fourth criterion are not satisfied. Such areas of law, criminal law, tort etc must, therefore, rely on the command of some central authority to enact it (at least with respect to large communities of actors). Trade, however, is primed for standardization through network effects.

This is a powerful supposition because, if true, it provides an account of how legal standards can self-standardize, rendering the concept of decentralized legal order—at least with respect to international trade—significantly more plausible. As there is no need a central body to legislate the rules of English grammar, there is no need for the central legislation of legal standards. Legal standards can self-standardize purely as the result of network effects and increasing returns in the ‘market’ for legal standards. The question who designated these standards is analogous to asking who designed the rules of English grammar—it is the product of a decentralized system exhibiting network effects. This insight diminishes the role of the state as a producer of law. It successfully destroys one of the two core functions of centralized legal power (ie formulation). The other main function that a centralized legal authority provides—enforcement—can also be achieved. In commercial communities, informal mechanisms, such as group sanctions in the form of commercial ostracization and reputational costs can, as many have argued, achieve the second function of enforcement. The degree to which enforcement can or cannot be sustained in a decentralized manner is, however, not the focus of the present discussion and lies squarely beyond the scope of the article. The focus here is not decentralized enforcement; the focus here is the ability of legal standards to self-standardize. For the most part, legal standards can find enforcement through the coercive mechanisms of state power—contracts terms are enforceable in the national jurisdictions parties select and arbitral awards are enforceable under treaty (ie the New York Convention).

Within networks of traders, legal standards facilitate commercial dealings. As such, the value of a legal standard increases as the number of actors who also employ the standard grows. There is an implicit value in adopting legal standards that


30 UN Convention on the Recognition and Enforcement of Foreign Arbitral Awards, 10 June 1958, 21 UST 2517, 330 UNTS 3.
are commonly used. Thus, as merchants engage in commercial ventures with different parties, a common ‘legal language’ will emerge. All else being equal, it is more practical to simply use one language, ideally the one that most people ‘speak’. Adopting a different, and perhaps unfamiliar, legal standard with each new commercial transaction imposes transaction costs on actors (known as switching costs in the literature). In the case of legal standards, the transaction costs in adopting a new standard will vary depending on the nature of the standard. Transaction costs may flow from the simple logistical inconvenience of adopting a new practice. In such cases, basic inertia may be sufficient to dissuade switching. In other cases, transaction costs may arise from the risk of employing a legally untested practice or one not widely used and so lacking a sizeable juridical support system.31 The extent to which the standard depends, directly or indirectly, upon there being a larger network of users will determine the switching costs.

While these transaction costs may, for the most part, be minor, that will not matter. They will levy a discernible impact. Provided that a standard boasts no significant advantage beyond that of simple coordination, there is every reason to adopt the practice that is employed by the majority of other merchants. This is clear with technological standards. Consider, for example, the competing Smartphone platforms of Apple and Android. The minor transaction costs of having to learn how to operate a slightly different interface is sufficient to dissuade masses of current Android users from switching to an iPhone, and vice versa. There must be clear benefits to switching from Android to Apple to offset the transactions costs in doing so. Although these costs may be minor, they are sufficient to corral users into a specific network standard. In fact, even where an alternative standard delivers increases in efficiency, if the standard has already attracted a large base of users, the appeal to switching to the superior standard may be substantially offset or altogether negated.32 Like a language that no one speaks, there is little value in subscribing to a legal standard if it is only you who does so. The benefit of standardization is the ability of agents to synchronize their interactions.33 This is known in the literature on standards as synchronization value. Synchronization value is ‘the benefit received by users of a standard when they interact with other individuals using the same standard.’34 The literature points out that synchronization effects will increase with the number of people using the same standard.35

In commercial markets, network effects have been invoked to explain the emergence of natural monopolies’ that create a unified standard. With respect to legal standards, network externalities may likewise be invoked to explain the ascendancy

31 CP Gillette, ‘Harmony & Stasis in Trade Usage for International Sales’ (1999) 39 Va J Intl L 707, 723 (‘As courts begin to interpret the vagaries of such terms, parties can use them with confidence (relative to novel terms) about how they will be construed in both commercial and legal environments.’).
32 The idea of ‘lock-in’ is of particular relevance here. The phenomenon of lock-in predicts the possible persistence of sub-Pareto legal standards as the result of network effects. This is a weighty insight. An extensive examination of the idea, however, lies beyond the scope of the present, short discussion. The problem of lock-in is, however, discussed again briefly in Section 6 with reference to top-down law.
34 ibid.
35 ibid.
of standards in the absence of a central authority to institute such standards. Such legal standards are not legislated decrees; they emerge in an entirely spontaneous fashion through the winnowing force of repeated interaction and network effect pressures. It is a form of spontaneous order. As there is no central legislating body responsible for the growth of language (L’Académie française aside) and yet language self-standardizes, legal standards undergo a comparable process in its formation and spread.36 Network externalities trigger a process of spontaneous self-standardization, as legal standards converge upon specific standards.

It is submitted here that network externalities have often played a pivotal role in the spread and standardization of legal standards where a centralized legislating authority is absent—particularly those of a commercial nature (because commerce encourages far more expansive interconnection than other areas of human interaction that requires regulation).37 Network benefits rather than centralized codification is what drives the adoption and diffusion of set legal standards in the absence of a centralized legislative authority. The existence of network externalities is an Adam Smith-like invisible hand. Standardization arises naturally in an unpremeditated fashion from a confluence of disparate forces working in blind coordination with one another, each adopting the legal standards that best serve their individual interests with an eye on the benefits of synchronization. This blind interdependence brings about a spontaneous order—an ‘invisible hand’ that guides the marketplace for standards. It is as Adam Ferguson describes it, a natural order that stems largely from (a phrase later adopted by Friedrich Hayek) ‘the result of human action, but not the execution of any human design’.38 It is a form of spontaneous social organization in the classic Hayekian sense.39

Thus, even where a legislative authority is absent, network effects can step in to produce spontaneous standardization. This, however, requires that the product (or activity) is one that delivers synchronization value. Commercial legal standards possess high synchronization value and are thus uniquely predisposed to network effects. Provided that there is a sufficiently high degree of interaction between participants, powerful network effects will appear in the market for legal standards as more and more users coalesce around particular legal standards. Provided that there is no particular incentive to not embrace the existing standard, it makes sense to adopt the recognized standard as one ‘plugs into’ a new network of legal norms. This is not to


deny that other factors may also influence this adoption choice. However, once network externalities begin to manifest, they will exert a powerful pressure that drives towards spontaneous convergence.

4. THE IMPACT OF POLYCENTRICITY: INTERCONNECTION AND INSULATION

Yet there are limitations to this kind of uncoordinated, network-effect-induced standardization. As stated, a key element here is the degree and scope of interaction: provided that there is a sufficiently high degree of interaction, a single network effect will come to dominate, smoothing out local inconsistencies and driving users towards a single standard. This, however, is not the case if the scope and intensity of interaction is not sufficiently high. In cases where interaction is retarded, multiple localized network effects will emerge, generating degrees of polycentricity (multiple centres of isolated standardization).\(^{40}\) In the literature on standards, this constrained impact of network externalities is known as a local network effect.\(^{41}\) Local network effects can be distinguished from global network effects, which encompass the entire (or at least a larger conglomeration of a) networked system.\(^{42}\) For example, an instant-messaging user gains more when her friends rather than strangers adopt the same service.\(^{43}\) Adoption of a standard by people ‘with whom the individual communicates more often or more intensively creates higher network effects than the adoption of people with a lower frequency or intensity of communication’.\(^{44}\) Indeed, the impact of a network effect ends precisely where the need for compatibility ends. Put simply, if I never leave the small town in which I live, I only need to learn the language of my small town. As such, islands of polycentrism will emerge as a result of market insulation. For standardization to transcend market boundaries and ‘cross-fertilise’, a certain degree of market interconnection is required, which insulation prevents.

To understand what I mean here by ‘insulation’, it may be useful to think of networks of actors\(^{45}\) linked together by trade simply as trading networks. Thus, for example, the global shipping industry or oil industry is a trading network. Yet these are

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\(^{40}\) Lon Fuller famously used the term to describe the difficulty of tinkering with interlocking complex networks with the image of pulling on a net of connected spider webs. L Fuller, ‘The Forms and Limits of Adjudication’ (1978) 92 Harvard L Rev 353.

\(^{41}\) There is a bourgeoning literature in economics on local network effects. For some early contribution in this vein, see A Sundararajan, ‘Local Network Effects and Complex Network Structure’ (2007) 7 BE J Theor Econ 1; B Dutta and M Jackson, Networks and Groups: Models of Strategic Formation (Springer-Verlag 2003); MY An and NM Kiefer, ‘Local Externalities and Social Adoption of Technologies’ (1995) 5 J Evol Econ 103.


\(^{45}\) I am speaking here primarily of private actors; however, this also applies to state actors. Some of this section on the principle of insulation is drawn from a previous paper of mine. B Druzin, ‘Anarchy, Order, and Trade: A Structuralist Account of Why a Global Commercial Legal Order is Emerging’ (2014) 47 Vand J Transnatl L 1049, 1081–83.
hardly hermetically sealed, discrete networks. Rather, upon closer inspection, the image of a single, unified commercial community dissolves into a loose amalgam of separate yet overlapping nested networks of commercial association. The coal industry, for example, spills out into and is interconnected with a dizzying array of other trading networks. What defines the ‘coal industry’ is not so much the coal per se, but rather the concentration of trading connections (interconnectivity) between commercial entities centred loosely on the production and/or trade of coal. As a trading network, the ‘coal industry’ sits somewhere upon a continuum of interconnectivity, varying profoundly depending upon which section of the industry we choose to inspect. It is in truth an amalgam of countless sub-networks, overlapping, nested and interconnected to differing degrees of connectivity. Indeed, to properly understand network effects, we must jettison the standard notion of a discrete ‘market’ and replace it with a more fluid concept, one based upon the ‘density’ of trading links. While economists may speak in terms of various markets, on a more abstract, conceptual level, the entire global economy may be said to be a single market in that it is technically interconnected. It is a single market marked by clusters of particularly intense interconnection based around certain products or services (this is also shaped by geographical and national boundaries, protectionist walls, tariffs, etc). On this more abstract, conceptual level, the extent to which we may speak of separate ‘markets’ corresponds only to the degree that parts of this single market suffer from low interconnectivity. Thus, when we say a trading network is insulated, it is not necessary that it is totally disconnected from all other trading networks (indeed markets do not exist in this manner). It is sufficient that it exhibits relatively less overlap with other trading networks.

It is not normally useful to speak of markets in this highly structuralist manner. So why do so here? For our purposes, this conceptualization is important because the degree of interconnectivity between trading networks, and thus the need for standards compatibility that arises in relation to this, will determine the comprehensiveness of standardization. The less interconnection a trading network has to other trading networks, the more it is insulated, and thus the less susceptible it is to the impact of large-scale network effects and standardization. A sufficiently insulated trading network will generate its own network effect much like the dialect of an isolated community. Within insulated trading networks, the standardization of certain legal structures will remain localized while a greater standardization of more general practices will result. We will see localized network effects.

Indeed, this accounts for existing and historic polycentricism with regards to legal standards. It is important that we are clear exactly what we mean when we speak of ‘markets’—the housing market, the credit market etc. While network effects may be highly discrete, the concept of a market is not. Given sufficient interconnection, standardization will occur across markets. If applicable, similar legal standards will emerge across disparate markets and generalized legal standards will tend to evolve. The relative insulation of a trading network will determine its susceptibility to network effects and its ability to also maintain localized standards. Thus, so long as some trading networks enjoy relatively robust insulation, polycentrism will continue to persist on certain levels. Indeed, this is precisely what we see in many quarters with respect to standards: the same industry may exhibit a broad range of regional standards and practices. This can largely be attributed to network insulation. With
regards to the *lex mercatoria*, a recent expanding literature questions the true sweep of market-induced uniformity in the law merchant, arguing that customary commercial law often exhibits pronounced ‘polycentrism’. Benson has defined the law merchant as ‘a distinct, but not independent, system of polycentric customary law evolving spontaneously from the bottom up through the interactions of merchants . . .’ This insight, however, does not undermine the present model. In fact, it supports it. The cause of this polycentrism is network insulation.

It is interaction between trading networks, and thus the need for standards compatibility that arises in relation to this, which induces a single standard to emerge. It is not a coincidence that while a single worldwide standard for fax machines and modems (where compatibility between regions is its express purpose) quickly emerged, multiple formats persist for digital televisions, for which compatibility across regions is not a key element. Some real-world examples may help to clarify the importance of interconnectivity versus insulation. Let me provide a few obvious examples.

The process of railway gauge standardization in the 19th century clearly illustrates this idea. From an initial hotchpotch of 19th century gauge width diversity, standardization gradually emerged. In the United States alone, there were seven different gauges in use in 1860. At the heart of this evolution was the element of interaction between networks in the form of transport between regions. Spatial isolation often impeded the development of standardization, as the absence of interaction (or potential interaction) did not provide the necessary impetus (easier exchange of traffic resulting in lower costs) to adopt widely used standards. As insulated networks came in contact with larger networks, however, this quickly changed. For instance, beginning in the 1830s, a few short lines in Britain employed gauge widths of 5'0" (1524 mm) and 5'6" for what was initially expected to be isolated local networks. When the expanding and more widely used Stephenson-gauge network reached these lines, they converted immediately. In North America, interaction likewise played a determinant role. Between 1866 and 1886, railway gauge standardization emerged largely as a result of the strong growth in the demand for interregional transport, such as the shipment of Midwestern grain to seaports along the coast. The fact that regions in Latin America, Africa and Asia saw less standardization can be traced directly to ‘the lower demand for interregional and international transport’. Similar examples of this include the gas, electricity (AC/DC current) and

47 ibid 72.
49 The following example of the spontaneous standardization of railway gauges is drawn from a previous article of mine. Druzin (n 16) 170–71.
50 For a detailed account of railroad gauge standardization in the United States, see A Friedlander, *Emerging Infrastructure: The Growth of Railroads* (Corporation for National Research Initiatives 1995).
51 Shapiro and Varion (n 48) 9.
53 ibid 287.
54 ibid 289.
55 ibid 291.
telephony networks created in the latter half of the 19th century.\textsuperscript{56} Another example of spontaneous standardization due to high interconnection and network effects are the universal use of Arabic numerals, which may likely be attributed to their use along extensive trade routes that required a common system for representing numerical values so essential for conducting business. Indeed, trade languages and pidgin can also be seen in this light. Electrical sockets are yet another example. The initial proliferation of socket standards during the first 50 years of commercial use of electrical power gradually declined to a mere handful of standards due to the desire for trade. However, these standards correspond generally to geographic regions,\textsuperscript{57} and stubbornly remain to this day, as they developed in a period of relative isolation that saw little inter-travel with electrical devices.

Had there been instead perfect interconnection in this initial period, a single universal standard for electric plugs would have emerged instead of the odd jumble of entrenched socket standards that presently exist.\textsuperscript{58} There is not yet enough communication (in terms of electrical devices) between these networks to induce coalescence around a single standard, so these conflicting standards remain.

The fundamental difference between railway gauge standardization and that of electric sockets is the degree of network insulation. By its nature, railway transport

\textsuperscript{56} Bekkers (n 20) 194. For what is known as the Battle of the Systems, see JA Bunn and P David, ‘The Economics of Gateway Technologies and Network Evolution: Lessons from Electricity Supply History’ (1988) 3 Inf Econ & Pol 165.

\textsuperscript{57} Formerly colonized countries are often exceptions to this.

involves interconnection and so dissolves regionalization. Electric sockets do not implicitly involve regional interconnection\(^{59}\) and so do not require synchronization. Indeed, insulation accounts for the fragmentation exhibited in language (and its relative persistence). Again, the value of a language increases commensurate with its user base—the more people who speak my language, the more people there are with whom I can communicate. Thus, the value of the language as an instrument of communication keeps growing. However, this increase in value is predicated upon the assumption that there is a never-ending supply of people with whom I wish to communicate. If there is a limit to the pool of people, there is a limit to the increase in value. If I only ever speak with 100 people, the network effect (in relation to me) will max out when it reaches the fringes of this group. This holds true for the language of regulation that oversees trade. Network effects will generate standardization in line with the degree of interconnectivity present. If this interconnectivity is low, however, network effects will not manifest as powerfully and will instead tend to generate local network effects, giving rise to legal polycentrism. The crucial point here is that high interconnectivity will produce network effects and spontaneous standardization—insulation will inhibit it.

### 5. THE RISING TIDE OF LAW: WHY INTERNATIONAL SHIPPING SHOULD BE PARTICULARLY SUSCEPTIBLE TO NETWORK EFFECTS

Now that we have unpacked the idea of network effects and examined their ability to trigger self-standardization, it may be useful to illustrate the model by looking more closely at a discrete area of the *lex mercatoria*—the *lex maritima*. The *lex maritima* may be understood as a subset of the law merchant.\(^{60}\) In its basic composition, the *lex maritima* ‘is composed of the maritime customs, codes, conventions and practices from the earliest times to the present, which have had no international boundaries and which exist in any particular jurisdiction unless limited or excluded by a particular statute’.\(^{61}\) With respect to the demands of the model, the *lex maritima* is well suited to examine the theory. This is because the *lex maritima* should be especially receptive to network effects given that it exhibits particularly high levels of interconnection. Indeed, interconnection is the very essence of shipping. Shipping is far more like railway networks than electrical sockets—it is implicitly inter-regional. This section provides a structuralist account of why the *lex maritima* should in theory be especially susceptible to network effects. As such, it is suggested as a case study to empirically examine the impact of network-effect-induced legal standardization.

The *lex maritima* should, on a basic structural level, be particularly predisposed to self-standardization through network effects. The networks of trade that spanned medieval Europe were also, for structural reasons, predisposed to the emergence of network externalities in that such trade involved high degrees of interconnection.

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59 Something that is changing with modern air travel and globalization. Yet this problem is easily overcome with the availability of electrical adapters that allow compatibility. This may be conceptualized as what in the network effect literature is known as ‘multi-homing’ practices—for example, merchants employing different kinds of incompatible credit card payment systems. Ferrell and Klemperer (n 43) 46.


61 ibid 108.
(indeed, this is the nature of trade). However, the *lex maritima* is an even more distilled version of this composition: it involves the tight, interlaced connection of otherwise insulated ports. It is, by its very nature, a vast network of interconnectivity, its patterns of connection akin to a modern telephony system or broadband grid. While the medieval *lex mercatoria* for the most part spanned across Europe, the *lex maritima* spilled out across the oceans. Historically, networks of shipping lines have grown commensurate with the growth of inter-regional trade, and as they did, they not only transported the goods they carried in their holds—they literally transported the customary practices that regulated international trade. The critical role that interconnection played in the medieval ascendance of the *lex mercatoria* is unmistakable: ‘Merchants began to transact business across local boundaries, transporting innovative practices in trade to foreign markets. The mobility of the merchant carried with it a mobility of local custom from region to region [growing] into dominant codes of custom of transterritorial proportions.’\(^\text{62}\) Indeed, this has been the case historically and it is very much true in the present age.

Consider the enormous expansion of international shipping trade routes over the last two and a half centuries. Below is a map created from historical shipping records depicting British shipping routes between 1750 and 1800 (see figure 2). During this period, the British enjoyed the most expansive trade routes among the three European maritime powers (the British, the Dutch and the Spanish) by a significant margin.

](http://www.theguardian.com/news/datablog/2012/apr/13/shipping-routes-history-map)

However, even the British Empire with its trade routes that spanned the Atlantic and Indian oceans dwarfs in comparison to the dizzying complexity of interconnection exhibited by modern global shipping lines (see figures 3 and 4). Shipping

connections in the modern age have now grown to enwrap the entire globe in a tight network of interconnectivity, crisscrossing jurisdictions and leaping between national boundaries.

Of course, not only have the connections expanded, but also, crucially, the volume of international seaborne trade has grown substantially over the centuries. As the intensity of repeated interaction increases, the pressure exerted by network effects increases as the value of synchronization grows. The result is existing standards not only become universalized but also become deeply entrenched. The basic structural dynamic of international shipping makes it especially receptive to this process, hence it is fertile soil for network-effect-induced legal standardization.

Legal standards as they relate to the world of international shipping are intrinsically interregional. Along with their cargo, maritime merchants ‘ship’ their legal standards across regions. Thus, if left unhindered, they are bound to slip from the leash of local jurisdictions and tend towards inter-regional standardization. In the early 19th century, US Supreme Court Justice Joseph Story wrote: ‘... from the natural tendency of maritime usages to assimilation, and from mutual convenience, if not necessity, it may reasonably be expected, that the maritime law will gradually approximate to a high degree of uniformity throughout the commercial world.’63 A keen insight, but what Justice Story failed to see in technical terms was that powerful network effects underlie and drive forward this process. An in-depth, historical analysis of maritime contracts, maritime arbitration processes, and maritime arbitration awards, showing how maritime law has standardized without or with minimal involvement of national law would provide support for the model. While not undertaken here, empirical research of this kind is strongly invited.

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63 J Story, ‘Progress of Jurisprudence’ in Miscellaneous Writings (1852) 418.
6. THE IMPACT OF TOP-DOWN LAW ON SPONTANEOUS STANDARDIZATION

The *lex maritima*, it has been argued, persists in three dimensions. The first is in the form of hard law: nationally codified modern maritime law. The second is within the realm of what is being increasingly recognized as soft law: that is ‘... in various international documents and understandings which have no legal authority, national or international ...’64 Yet the modern *lex maritima* is also evolving within the realm of what is understood here as spontaneous law, which includes arbitral awards increasingly based on ‘international trade usages and custom and on general principles of law recognized and accepted by the international community of merchants’.65 This can be understood as a continuum defined by the extent that legal standards evolve in a controlled manner, the design of an authority of some kind. An important question then arises: what role has law played, and continues to play in the spontaneous

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64 Tetley (n 60) 144.
65 ibid 145.
standardization of the *lex maritima*. To this end, we need to consider the impact of both soft law and hard law.\(^6^6\) By soft law I mean quasi-legal instruments that have no legal binding force, such as non-binding resolutions and declarations, guidelines created by governments and private organizations alike.\(^6^7\) By hard law I mean binding legal instruments, such as self-executing treaties or international agreements. Nationally codified domestic laws are included under this heading. For expository convenience, I refer to both soft and hard law as ‘top-down law’ in that, although distinct, they both involve higher degrees of deliberate design and so may be contrasted with legal standards that emerge from a more decentralized, informal process. With these categories defined, let us now consider the relationship between top-down law and the spontaneous standardization of the *lex maritima*.

Has top-down law hindered or reinforced uniformity in the *lex maritima*? The short answer is that it seems to do both. When top-down law merely codifies pre-existing network-effect-induced standards, it reinforces these network effects by providing clarity in the market, much like standards setting organizations do with respect to certain industries. Formal codification may bolster burgeoning network-effect-induced standards where there are competing network effects, tipping the market so that users rally around one standard that then comes to dominate the market. Even more crucially, top-down law enables parties to sidestep national laws altogether through the use of international arbitration. Top-down law, however, may also exert an inhibitory effect with respect to standardization.\(^6^8\) Top-down law can trigger polycentrism by introducing artificial network insulation. Thus, top-down law hinders inter-regional standardization where it attempts to legislate from whole cloth instead of simply formalizing existing standards induced by network effects. Recall the question posed at the outset of our discussion: without a centralized authority, can a coherent, standardized corpus of transnational shipping-related law successfully evolve, or is it destined to become a fragmented, polycentric collection of conflicting legal practices and norms? The answer is that a standardized corpus of transnational maritime law has historically evolved as the result of network effects (and indeed will continue to emerge), and top-down law (both its soft and hard variants) can either be an obstacle or an aid towards this end.

A close examination of the impact of top-down law on standardization reveals a highly nuanced process. Rather than a process of pure standardization, unaffected by the direction of top-down law, we more commonly see a semi-spontaneous standardization—a continuum of spontaneity marked by the presence of top-down law or the comparative lack of it. Let us look closer at how top-down law can hinder or promote standardization.

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\(^{66}\) Below, I borrow some of the terminology of the international law literature. In international law, *hard law* is used to refer to binding legal instruments and laws, such as self-executing treaties or international agreements. Recognized customary law may, under the right circumstances (if it is recognized as such), also fall under this definition. However, for our purposes, it is understood here as a separate category.

\(^{67}\) We can distinguish between trade-made soft law and state-made soft law. Arguably, the former is more likely to be followed willingly and lead to interactions creating unarticulated rules (or informal law) rather than complied with grudgingly (as would be state-made soft law)—the argument being that trade-made soft law may better capture the standards that have the most currency among merchants.

\(^{68}\) This, of course, is not the case where the very purpose of top-down law is to achieve harmonization between standards.
A. Top-down Law as a Hindrance

Up until around the end of the 16th century there was a substantial degree of homogeneity in European maritime law.69 This, however, began to change as national legal codes absorbed, transmuted and distorted this corpus of law. With the emergence of the modern state, the *lex mercatoria* (which the *lex maritima* formed a part) was largely co-opted by national laws and transformed.70 National laws incorporated existing merchant practices, and to the extent that these legal standards were modified by statute, network insulation resulted, disrupting the process of network-effect-induced standardization. To the extent that national laws produce insulation, giving rise to legal polycentrism, national legal systems fragmented the degree of standardization that the *lex maritima* had hitherto achieved spontaneously. When national legal systems function in this manner, they can be conceptualized as something similar to tariffs in that they prevent the free flow of legal standards between regions, comparable to how trade protectionism disrupts the natural flow of trade across borders. It is not difficult to see that if competing national laws create conflicting rules this will produce polycentrism, generating insulated pockets of incompatible standardization. I submit that, if they had been entirely left to their own devices, modern commercial legal standards writ large would demonstrate a far greater degree of standardization then at present. The co-opting of merchant legal standards by nation states largely stymied the process of network-effect-induced standardization naturally underway.

Historically, a great deal of polycentrism existed in the law merchant.71 The medieval law merchant was not the unified corpus of law many scholars have made it out to be.72 I posit that this was the result of regional insulation: a simple lack of interconnectivity attributable to geographical, political or market isolation. While it would require a degree of empirical investigation I am unable to undertake here, I argue that wherever there were high levels of interconnectivity characterized by high volumes of trans-regional trade, legal standardization emerged as a consequence.73 Indeed, on this point the theory presented here has the virtue of being open to falsification through a careful historical examination. Given that the international community has been growing increasingly less insulated with the ever-increasing pace of globalization and international trade links forging vast networks of interconnection, legal polycentrism (at least with regards to commercially oriented law with its built-in propensity towards inter-regionalism) is destined to fade but for the artificial insulation generated by national legal systems. Where pre-existing legal standards were altered through codification, the absorption of merchant legal standards by national laws hindered, and continues to hinder standardization on a more global level.74

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69 Tetley (n 60) 109.
70 Trakman (n 5) 23.
71 Benson (n 46).
72 Trackman, Benson and other writers have certainly fallen victim to this, although subsequent publications by Benson step back quite a bit from the argument. Benson (n 46).
73 Indeed, such empirical investigation is invited. It would, for example, be very interesting to study the exportation of the Rhodian Law, the Roles of Oleron, the Barcelona Code and the Laws of Wisby. Some of these are still referred to in the English courts to this day.
74 This is ironic because national laws are a powerful source of domestic legal standardization; however, this stops at the nation’s borders. Indeed, that is precisely the problem.
Where, however, national laws allow for the absorption of emerging (transnational) norms, standardization may be facilitated. The problem is that national laws are no longer efficiently absorbing emerging norms.

B. Top-down Law as a Solution to Lock-in

It should be noted, however, that top-down law undermining network effects in the market for legal standards is not a negative thing in all cases (if our goal is efficient standards). The mere fact that customary law emerges in a more organic fashion driven by network effects does not ensure that the standards generated by this process are optimal. Network-effect-induced standardization may have the perverse effect of locking in sub-optimal practices. In such situations, parties do not abandon such practices although—but for the presence of network effect pressures—parties would switch to an alternative standard. In the literature on standards, this is known as ‘lock-in’. Lock-in occurs when a customer becomes dependent on a vendor’s products or services, and as a result is unable to abandon the vendor’s standard for an alternative because of high switching costs (discussed in Section 3).

A legal standard will be preferred notwithstanding its sub-optimality so long as the transaction costs of independently switching to a new standard is higher than the expected inefficiency of continued use. Although, the inefficiency may be minor with respect to each interaction, over time, this tendency can gradually distort a market for legal standards by shutting out competition and inhibiting the incremental emergence of more efficient standards. This can render such markets essentially non-competitive and monopolistic. Although parties remain free to contract around the inefficient practice—indeed, this is a key advantage of bottom-up ordering and contract—they will not do so because network effect pressures will bias users against adopting alternative, slightly more efficient standards even where they become recognized as such. This will not hold true in cases where the inefficiency is significant. In such cases, the transaction costs of adopting a new standard will be insufficient to keep out a more efficient competitor. However, lock-in need only exert influence along the margins for it to be significant. If customary rules build upon themselves in an evolutionary fashion as many contend, network effects will retard the
incremental emergence of more efficient norms because it stifles this process at less conspicuous yet crucial points of modest transformation. And it may very well be that normative change that occurs at this level is, in the long run, far more impactful than punctuated moments of dramatic change. Thus, on the micro-level of private actors, the entrenchment of slightly sub-optimal legal standards may not be significant, yet on a higher level of generality, this may yield a profoundly distorting impact.

The presence of network effects in the market for legal standards represents a theoretical challenge to those who argue that customary rules spontaneously evolve towards efficiency because network effects may impede this process—not in a very pronounced way when viewed on the micro-level of individual interactions, but nevertheless to a potentially significant degree when viewed on the macro-level of a large complex evolving system of rules. It thus may be argued that lock-in poses a serious problem for the position that bottom-up legal ordering evolves through a process of natural selection towards ever greater efficiency—at least peak efficiency.79 Indeed, a great deal of ink has been spilled on the non-competitive impact of network effects in commercial markets and the potential of network externalities to generate Pareto-inferior market results.80 The literature on standards suggests that ‘[m]arkets may exhibit “excess inertia” and remain locked into a standard, even though an objectively “better” standard is available.’81 Although ‘all users would be better off with the new standard, those benefits do not accrue to the present users who must pay for switching’.82 Lock-in can in this fashion generate sub-optimal equilibria.83 Richard Posner and Eric Rasmussen note that ‘If the transitional costs to a
new norm are high enough, we have the phenomenon of a norm “trap”, meaning that society is stuck with a suboptimal norm because of the costs of changing it.84

Users are locked into using the standard to the extent that they are unable to collectively jump to a new, not widely used standard without incurring transaction costs in doing so and the gains from the alternative standard do not offset these costs. A certain chicken and egg paradox emerges in such a situation: ‘consumers are not interested in purchasing the good because the installed base is too small, and the installed base is too small because an insufficiently small number of consumers have purchased the good’.85 This makes it very difficult to achieve sufficient critical mass. In the literature on standards, this has been termed the penguin effect: ‘Penguins who must enter the water to find food often delay doing so because they fear the presence of predators. Each would prefer some other penguin to test the waters first.’86 Top-down law boasts an enormous advantage here in that it can simply bypass this lock-in effect and enact better law.

Consider the example of the divided damages rule in ship collision. Historically, if both parties had fault, the principle prescribed that damages would be borne equally by both parties as opposed to apportioning damages commensurate with fault.87 This long-standing principle of the *lex maritima* was likely a child of pragmatic necessity, the careful determination of fault and all that entails being technically difficult to ascertain on the transient high seas. The rule is of ancient origin and was likely applied to ship collisions in the centuries before it appeared in the early maritime codes, such as Article XIV of the *Rôles d’Oléron* dated from the 12th century as well as in other Northern European codes of that era.88 Statute rectified this deficiency in one fell swoop of the pen. In the UK, the Maritime Conventions Act 1911 replaced the rule with proportionate fault.89 In the United States, the principle was finally abandoned judicially by the Supreme Court in 1975 in *United States v Reliable Transfer*.90 Hard law can prove extraordinarily valuable in this respect. However, notwithstanding the ability of hard law to rectify lock-in inefficiencies such as these, where codification produces insulation through the creation of conflicting standards, top-down law is a hindrance to legal harmonization.

84 R Posner and E Rasmusen, ‘Creating and Enforcing Norms, with Special Reference to Sanctions’ (1999) 19 Intl Rev L & Econ 369, 378. Robert Ellickson also discusses inefficient lock-in with respect to customary rules, but ultimately concludes that the true nature of its effects is debatable. Ellickson (n 36) 58.
89 1 and 2 Geo S, ch 57, 1 (UK) giving effect to the Collision Convention 1910, adopted by the Comite Maritime International (CMI), 23 September 1910 (Brussels).
C. Top-down Law as a Reinforcement

Top-down law, however, need not always act as a hindrance to spontaneous legal standardization. In fact, top-down law can powerfully reinforce standardization. Indeed, where it simply confirmed existing standards, the influence of the *lex maritima* increased where previously the principal source of custom was merely oral.91 Through codification, pre-existing customs became formalized.92 A good early example of this was the *Rôles d’Oléron*. Top-down law can be instrumental in providing greater clarity as to what is the recognized standard. This clarity can levy a critical influence, tipping markets experiencing multiple standards. In commercial markets, multiple standards are often a problem. However, if networks of actors sufficiently overlap, conflicting standards cannot coexist indefinitely. Incompatible standards may persist for a period of time, but if there is a high degree of interconnection, the market will sooner or later ‘tip’, triggering the total market dominance of one network standard.93 A high degree of natural network insulation will, however, prevent this from occurring. Multiple standards can ‘survive if network effects are primarily localized within subgroups of adopters, segmenting the market . . . ’.94 A market splintered in this fashion is ‘a dysfunctional equilibrium with multiple small and consequently unsuccessful networks instead of one large and successful one. The solution to this dilemma requires a leadership-like ability to focus on “let’s all do X instead”’.95 A market equilibrium of competing network standards will generate inefficiencies for actors forced to switch between standards.

The inefficiency of this dynamic is captured in the case of language. Language networks are able to coexist primarily because there is sufficient insulation between communities of language speakers. For users who need to operate within multiple networks, it is highly troublesome to switch between linguistic standards. There are many commercial examples of this same problem. The standards war between AC/DC current in the 19th century, known as the ‘Battle of the Systems’, fought between Edison versus Westinghouse in Electric Power, lasted decades,96 with AC current finally achieving market dominance (due mainly to technological innovations that lobbied against the use of DC).97 A not widely known fact is that fax technology was actually invented in 1843 but stalled for well over a century until broad standardization between incompatible fax systems materialized in the late 1970s.98 RCA and CBS fought a protracted battle over the US standard for colour television in the 1940s and early 1950s, which was only resolved by the FCC eventually regulating an

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91 Tetley (n 60) 109.
92 ibid 110.
94 Ferrell and Klemperer (n 43) 85. Arguably, even within the field of shipping, there is insulation between different sectors within the shipping industry eg container, dry bulk, wet bulk, LNG, passenger carriage, etc. Indeed, while the *lex maritima* generates a high degree of interconnection, perfect interconnection is a virtual impossibility.
95 ibid 60.
96 Shapiro and Varion (n 48) 10.
97 ibid 11.
98 Ferrell and Klemperer (n 43) 61.
official standard thereby enabling compatibility. Indeed, industry standards can be unilaterally set by organizations such as the American National Standards Institute (ANSI) or the International Organization for Standardization (ISO). In fact, most standards wars in commercial markets are resolved in this manner by an industry standards setting body or public agency. In the market for commercial legal standards, top-down law can serve an identical function. In essence, top-down law (both soft and hard) can function in the same capacity as a standards setting body, providing a powerful signal to the market that can cause users to coalesce around a specific standard.

While lacking any formal legal authority, international documents and understandings can nevertheless powerfully reinforce standardization. There are many examples: the BIMCO bills of lading, standard form charter parties; the York-Antwerp Rules 2004 on general average; the Uniform Rules for Sea Waybills 1990 of the CMI; and the Voyage Charter Party Laytime Interpretation Rules 1993. Such soft law instruments do not need the force of formal legal codification (i.e., hard law) because they are already powerfully reinforced by pre-existing network effect pressures implicit in the market. These network effect pressures render the market susceptible to spontaneous coordination—all that is required is the creation of focal points (à la Thomas Schelling), after which actors will coalesce around specific standards without further prompting. The success of these instruments, although lacking formal legal authority, can, I argue, be largely explained by network externalities. Such instruments exist ‘without any national or international legislation. Similarly, many bill of lading forms have been adopted for international use, with internationally accepted meanings, without the benefit of any intervention by national or international governments.’ Just as the rules of English grammar do not require enforcement, the standards created by soft law do not require enforcement. Indeed, dictionaries do not enforce linguistic standards; they merely clarify them.

Many observers may be tempted to conclude that soft law has relatively limited force because they lack enforcement mechanisms. However, when network effects underlie soft law, this is decidedly not the case—they can exert tremendous compliance pressure. The clarity that such instruments provide reinforces the power of the pre-existing network effect. Standards underpinned by these network effects often

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99 Shapiro and Varion (n 48) 12.
100 ANSI is a US sub-group of the ISO. It is interesting to note that the ISO has no enforcement powers—it can develop standards but the industry is then free to adopt them. Arguably, the fact that an ISO standard has been widely adopted illuminates the standardizing impact of network effects pressures.
102 Further examples can be found in the realm of international economic law and transactions. For instance, standards with relation to competition policies, trade rules and investment principles. J Chaisse and M Matsushita, ‘Maintaining the WTO’s Supremacy in the International Trade Order—a Proposal to Refine and Revise the Role of the Trade Policy Review Mechanism’ (2013) 16 J Intl Econ L 9, 9–36.
104 Tetley (n 60) 134.
need only be enunciated clearly to trigger a greater coalescence around them and an abrupt abandonment of competing standards. The impact of soft law within the realm of transnational commercial law is being increasingly recognized: to an ‘ever increasing extent, legal rule-making is affected by “formulating agencies” in the form of governmental and non-governmental institutions rather than by domestic legislatures. As a consequence, harmonization and creation of the law is no longer initiated ‘top-down’ by the legislative authority of sovereign states . . . ’.106 In the case of international arbitration, the UNCITRAL (United Nations Commission on International Trade Law) Arbitration Rules is perhaps the consummate example of the power of a soft law document to coordinate a standards market.107 I would argue that much of the influence of soft law can be attributed to underlying network effects that drive convergence.108

Because of its enforcement mechanisms, hard law can play an even more authoritative role in terms of tipping a market possessing multiple standards. This may take the form of binding international conventions. Consider, for example, the maritime practice related to marine salvage (the act of recovering a ship and/or its cargo after a shipwreck). The principle of salvage can be traced back to antiquity.109 It stipulates that a salvor who provides assistance should be remunerated even if the salvage is unsuccessful.110 However, salvage custom developed differently in England (likely as a result of network insulation) being based on a ‘no-cure-no-pay’ principle.111 The 1910 Salvage Convention,112 to which the majority of maritime nations are a party, tipped the entire market and established the ‘no-cure-no-pay’ principle as the recognized standard the world over.113 The 1910 Salvage Convention effectively ‘sponsored’ (to use the terminology from the literature on standards) the network standard established by English law, allowing it to achieve total market dominance.114 However, hard law, even in the form of an international convention, may have the unintended consequence of legal ossification and failure to take into account emerging unarticulated rules. The entrenched quality of the Hague–Visby Rules, in spite of their age (1968), is a good example of this.115 Again, this may be

107 This point also applies to UNCITRAL’s Model Law on International Commercial Arbitration. However, the Model Law is aimed at lawmakers at the national level, whereas the Arbitration Rules are directed at the parties to a dispute. As such, the Arbitration Rules are far more likely to be driven by network effect pressures.
108 I have written elsewhere on the relationship between network effects and soft law. B Druzin (n 26) (arguing that network effects help to explain why, although lacking legal and coercive force, so much soft law is widely adopted and followed).
109 Tetley (n 60) 133.
110 ibid 132.
111 ibid.
112 Adopted at Brussels, 23 September 1910.
113 Tetley (n 60) 132.
114 The close of the 20th century saw the introduction of Special Compensation remuneration for salvors—the Special Compensation P&I Clause (SCOPIC)—by salvors, P&I Clubs, underwriters and other parties. SCOPIC took effect in 1999. The most recent edition is SCOPIC 2011.
115 Two other conventions have since been adopted by UNCITRAL but neither has achieved anything like the same level of acceptance by major maritime nations.
largely attributed to a lock-in effect generated by network effects. While hard law can often be very useful for smoothing out blockages in network interconnectivity that lead to polycentrism, more likely than not, it is a force for that very polycentrism.

7. POSSIBLE OBJECTIONS

When constructing any theory, there is always a risk of ignoring the potential criticisms of the model one is proposing. Some theoretical caution is thus needed. In an attempt to pre-empt such charges, I discuss some possible objections to the model below.

A. Conclusive Proof

Foremost among these is perhaps the objection that the discussion does not conclusively prove the theory—it merely articulates the theory. Conclusive proof, however, was never the objective. Rather, the aim of the article was to set out the theory that legal standards can, given the correct conditions, spontaneously standardize, situate the theory in the context of maritime law where we would expect the impact of network effects to be most pronounced and acknowledge the model’s possible limitations. Empirical proof is tricky. While this was not realistic due to spatial constraints, such investigation is invited in that it would more rigorously test the strength of the article’s assertions. As already mentioned, a key advantage of the present thesis is that it is in many respects falsifiable—ie from it, one can make specific predictions that may be tested. A central prediction is that whenever the four criteria for spontaneous standardization are present and a market enjoys sufficient interconnection, and is not regulated or is under-regulated, spontaneous standardization will emerge. How robust this emergence is will depend on several factors—the degree of network interconnection versus insulation, the impact (if any) of top-down law, etc. While the discussion did not categorically prove the model, the hope here is that the template for a theory of spontaneous legal standardization was provided so that others may do so.

B. Limited Application

Another potential objection to the model is that even if it is shown that maritime law exhibits spontaneous legal standardization, the fertile conditions of maritime law may not extend as readily to other areas of the law. There may, therefore, be limits to our ability to confidently generalize the model across the broad spectrum of law. It may very well be that spontaneous legal standardization is less likely to develop in other areas of commercial law, ones where conditions are less ideal. If this is true, however, it is true only to a matter of degree—it is not fatal to the model. As the model assumes, any non-regulated (or under-regulated) legal environment that possesses the four criteria for spontaneous standardization will produce network effect pressures commensurate with the degree of interconnection of the network. This may be more pronounced in certain areas of legal intercourse than in others. However, given the increasing interconnection of the international economy, it is not controversial to expect the model to grow more robust over time, not less.
C. Overconcern with Geographic Interconnection

Some readers may object that the discussion’s focus on maritime law demonstrates an overconcern with geographic interconnection. This is a fair objection. In fact, network interconnection in modern commerce is increasingly likely to be based on functionality and other considerations rather than simple proximity. Advances in modern technology allow for a degree of heightened interconnection that is markedly less constricted by geographic realities as in past centuries. Modern commercial markets relate to technologies and financial arrangements that do not correspond to the crude realities of physical interconnection, allowing the creation of legal standards that may be uniquely suited for the traders in those specific markets although the network has no actual geographic connection.

This is of course true. As we retreat further back into history, however, this becomes less true. Network interconnection in previous centuries was far more determined by geographic interconnection (and it still is to quite a high degree). Indeed, within the medieval law merchant, overlapping ‘layers’ of legal standards roughly corresponding to region can be discerned. For instance, Emily Kadens notes how the medieval law merchant possessed both pan-Europe norms and a body of regional norms reflecting customary discrepancies between Northern and Southern Europe, and even region-specific standards regarding such things as the timing and organization of local fairs.116 Simple geography, and the network interconnection that it implied, has played an extremely dominant role in shaping the emergence legal standards throughout history. While the importance of proximity as the determining factor of network interconnection has diminished in the modern international economy, as a discrete area of law that can shed light on the standardizing impact of network effects in a historical context, the *lex maritima* is an ideal case study, and so was a subject of focus in the discussion. This should not, however, be understood as implying that it is the only highly interconnected market that will generate network externalities—merely that it is one that lends itself well to the model.

D. The Discussion Ignores Normative Issues

Another potential criticism is that the discussion provides only a positive theory and does not explore the normative implications of the model. While I see this as a methodological strength rather than as a weakness, many may argue the opposite. For those readers who may find themselves in this camp, I briefly reference here several considerations of a normative nature that flow from the model. For those who prefer a purely positive analysis, please feel free to skip the remainder of this section.

One of these considerations, the impact of lock-in, was already discussed. Legal standards that are no longer optimal becoming entrenched and resistant to competition may be of concern if the efficiency of legal standards is desired. As discussed, in the case of gross inefficiencies, actors will likely contract around these standards; however, the concern is that slightly inefficient standards may persists as a result of

the transaction costs incurred in adopting new standards, and that this will short-circuit a broader evolution towards efficiency.

Another concern is the process of ‘over-standardization’. Greater degrees of standardization may not always be optimal. Yet, given the absence of network insulation, network effects push inescapably towards ever-greater degrees of standardization. The desirability of standardization will depend ultimately on the area in question. Clearly, a universally standardized railway gauge is beneficial; however, this may not necessarily be the case for a single minimum wage or one emissions target uniformly applied to each country. Legal polycentricity has its advantages. It is often the case that many rules that are effective for one type of transaction or one trading community may not be effective for another. With respect to international arbitration, for example, a degree of diversity may be a good thing in that it allows parties to ‘shop’ for rules and fora they prefer, injecting competition into the market. Related to this is the danger that standardization across functionally based polycentric legal systems could produce homogenized law that limits the potential for specialization. Robert Cooter makes this point, arguing that in an increasingly complex international economy more decentralized lawmaking may actually provide greater advantage. Economies of standardization may not be nearly as efficient or useful as many contend and may in fact be shrinking, whereas the benefits of specialization are relatively large and growing.

The focus of the discussion, however, was not the normative implications that arise in conjunction with the model; rather, it was the explanatory power it brings to the process of legal standardization in the absence (or limited impact) of state law. The model is not intended to serve as the basis for normative judgments about the properties of ‘good’ transnational commercial law. A strong case could be made that the process of spontaneous legal standardization that this theory describes is not conducive to ‘good law’. However, the article is not intended to be understood as an endorsement of bottom-up law over top-down law. With respect to all of the objections noted above, while they are valid (some perhaps more than others) none are actually fatal to the model.

8. CONCLUSION

In a nutshell, the question this article posed was this: without a central legislative authority, who or what will create the rules of the game? The answer was that spontaneous standardization may be the product of a system exhibiting network effects. The central contention of the model that the article proposes is that wherever the four criteria for network effects are satisfied, standardization to some degree will occur. The more these conditions are satisfied, the more robustly standardization will manifest. The implications of the theory are weighty: it suggests that it is possible for a coherent and largely harmonized body of commercially oriented law to emerge in an uncoordinated, decentralized fashion.

117 I have discussed this idea elsewhere with respect to soft law. B Druzin (n 26). I draw from the points regarding ‘over-standardization’ made in that article here.

The *lex maritima* was selected here because it is in many respects an ideal area of law to illustrate the model. Maritime law, by its very nature, is structurally calibrated to produce network effects because of the fluidity in the form of shipping lanes and the highly interconnected nature of transport routes. Shipping links are like communication networks with nodes mimicking the complex circuitry of defined social networks. Yet it should be appreciated that the theory applies to all forms of spontaneous legal standardization that meet the four criteria. It is merely a matter of degree in terms of how powerfully network externalities will manifest. The model in fact has a large scope of potential application. As alluded to in the introduction, it may in principle account for the early decentralized emergence of all legal order. Indeed, in a small group context (where customary law tends to arise) the four criteria of spontaneous legal standardization are commonly met. This fascinating extension of the theory, however, is beyond the scope of this short article.119

A few closing qualifications regarding the theory are needed. Models of this kind are unavoidably crude instruments. The problem is that reality is often quite messy. As such, examination of an empirical nature, where this is possible, is invited in that such research would go far in bolstering the theory’s claims and defend against the charge that the model is an oversimplified representation of reality. Another point is that a variety of considerations may influence actors’ decisions and blunt the impact of network effects. On a macro level, however, network effect pressures will levy a discernible influence on the decentralized emergence of legal standards. That being the case, the theory of spontaneous legal standardization outlined here may serve as a useful model to understand not only the present but also the future development of supranational legal order more broadly in an increasingly interconnected world. Indeed, the model suggests that given the accelerating pace of globalization and the tightening of interconnection across the world, we will likely see a further convergence of legal standards to the extent that conditions conform to the requirements of the model.

119 It in fact forms the basis of other work I am currently doing.