The Dichotomy of Decision Sciences in Information Assurance, Privacy, and Security Applications in Law and Joint Ventures

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***Abstract*— Research and practice in decision sciences can be viewed from the dichotomy that exists in decision making and decision taking, where decision making is considered as consensus driven process and decision taking is considered as an act. We build upon a conceptual paper presented at INFOCOMP 2014 considering Law as different types of network and how an understanding of these networks, at the systems level, might assist in decision making and taking processes necessary for: information assurance; privacy; and security applications in Law – as may be applied in Cyber through emerging legal networks. We first identify the systems we might be working with before considering Law as a networked ecology. We then look at law beyond existing stable, more certain and ruled jurisdictions and how it might be applied to decision making and taking in Cyber. We consider an example of how law may apply in areas of uncertainty and where existing jurisdictional remits may no longer apply, e.g., in stateless jurisdictions or those impacted by instability and uncertainty following a disaster. We conclude by considering how Legal Networks may assist in the decision making, taking and social problem solving processes in Cyber and so contribute to system resilience.**

Keywords-Collaboration; Network Law; Stateless Jurisdictions; Fuzzy Logic; Ecologies; Good Faith.

I. INTRODUCTION

This paper considers Law as comprising different networks and how an understanding of these networks at the *systems* level might assist in the decision making and taking processes with particular application in addressing complex problem solving such as recovery from recession and in Cyber [1]. We first identify the systems we might be working with before considering Law as a networked ecology. We note that Europe has two different types of jurisdictional systems identified as *Common Law* and *Statutory / Codified* Law. We suggest that in recovering from recession, both these 'conceptual and normative tools [will be necessary] to [re]connect…Europe to its institutional design' [2]. Furthermore, having both *Common* and *Statutory* Law may provide a unique European *co-adaptive* [3] advantage by providing the essential *variety* [4] for complex problem solving. Regeneration of Europe without enabling interaction between the two codes would potentially 'exclude large groups of citizens from the political process, but also, in the long run, destabilize and delegitimize the European…project' [2]. As John Dunne [5] comments, 'if a clod be washed away by the sea, Europe is the less'. This paper looks at law as networks and the lacunae that exist between and beyond largely state-based jurisdictions, e.g., in Cyber. We consider how such an approach might be applied to better managing instabilities, such as containing or preventing an epidemic or recovery from recession. We identify examples of how law and civil infrastructures and their associated networks may interact. We conclude by considering *Jurisprudential Networks* and *Network Law* and how their ecology may exist with similarly entangled legal networks.

Combined, the authors are thematic leads in the areas of complex systems, contract law, digital and cyber ecologies, the management of knowledge including commercial law, restitution and dynamic social networks. The authors bring this knowledge to bear in the emerging area they posit to be 'Network Law' and 'Jurisprudential Networks'. Section II identifies the legal statutory and network systems and structures we may be working within before in the next section examining law as a network. We then consider Law where it presently stands and as it may be applied in areas beyond the state and thereby more certain jurisdictional controls and enforcement. Finally, we consider what may be termed 'Cyber-in-Law' and scope how such legal ecologies may emerge and may assist the decision making and taking process.

II. SYSTEMS IDENTIFICATION

Communications literature maintains that hierarchical structures provide a superficial representation of how work actually gets done [6]. Similarly, Stacey [7] posits that dynamic organizations should be viewed as a collection of

informal social networks (i.e., shadow structures beneath the formal structures); so allowing their elasticity to sustain continuous innovation and learning [8]. Also, taking Granovetter's [9] notion of the importance of strong and weak ties, we suggest the economic sociology of system identification and argue that weak signal detection could serve as proactive strategy for exploring 'Network Law' and 'Jurisprudential Networks' in cyber. Using this as a basis for system identification, we consider decision making and taking as to 'how work gets done in networks'; 'how work may be organizationally gradated within Law', and finally, in terms of the two predominant 'codes' of law.

A. Abbreviations and Acronyms

Within organizations and networks, we consider one of the underlying principles to be that of *trust* and the trusts established between networks to allow *systems* to work without being ordered to do so. These systems we contend extend to include Law and its application. As identified by Shaw [10]:

> Perhaps the most important general principle, underpinning many international legal rules is that of *good faith*. This principle is enshrined in the UN Charter, which provides in Article 2(2) that "all Members…shall fulfill in *good faith* the obligations assumed by them in accordance with the Charter".

Similarly, the International Court declared in the *Nuclear Tests* case [11], *inter alia*:

> One of the basic principles governing the creation and performance of legal obligations, whatever their source, is the principle of *good faith*. *Trust* and *confidence* are inherent in international co-operation [we call collaboration], in particular in an age when this co-operation in many fields is becoming increasingly essential. Just as the rule of *pacta sunt servanda* [agreements must be kept] in the law of treaties is based on good faith, so also is the binding character of an international obligation assumed by unilateral obligation [12].

These understanding of trust are very similar to those developed by Augustin José Menéndez where he states, *inter alia*:

> The first [*instrument*] is the instrumental inclusion of *trust*. From the political perspective, *trust* needs to be developed in the EU, to *legitimize* majoritarian and redistributive politics and strengthen center-periphery relations. *Trust* both enhances societal compliance with transnational norms of cooperation and conformity, and at the same time provides the *common* framework in which transnational cooperation enables the construction of social institutions. This is…the implicit trust and understanding that comes from a continent full of citizens that interact, on a continuous and *intuitive* basis. And that sense of *mutual trust* that comes from communication, and communication alone, can further stabilize both the European space and legitimize the Union's position in it [2].

Mumford [13] considered an important *risk* factor to be *trust*: 'because innovation is frequently a journey into the unknown, *trust* is a major factor in its successful assimilation'. Contrastingly, Giddens [14] defines trust as 'confidence in the reliability of a person, or system, regarding a set of outcomes or events' and Mumford further observes 'risk and trust are inextricably intertwined'. Considering *good faith* as combining *trust* and *confidence* and taking forward Mumford, Giddens and Mintzberg's [13]-[15] understanding, it is suggested that:

> '*Trust* may be a function of the Likelihood of a person or system being able to comprehend, explain, understand [risk] by logic and deal with a set of outcomes or events' [16].

Therefore, *Risk* may be considered as obverse to *Trust*:

> '*Risk* may be a function of both the Likelihood of an adverse event occurring and a system or person's ability to comprehend, explain and understand [risk] by logic' [16].

We posit (after Hossain & Wigand [12]) that organizations need to be seen as dynamic (elastic and plastic) *social-influence* networks (*SINners*!) In these collaborative [16] networks, complex operations (requiring tacit knowledge exchange [17]), are achieved through social (and in this respect, also cyber-) interactions beneath the formal hierarchical control structures. *Co-adaptive* [3] viability in maintaining operational effectiveness and efficiency [18] may therefore depend more on how we socialize and capitalize 'our' formal (hierarchical) and informal (social) networks to achieve shared common goals. In this paper, we consider *law* as a network applying both formal coordination by control and rule (CRC) and informal collaborative social influence (CSI) networks [19]. We further identify, building on work by Harmaakorpi et al. [20] a 'techno-socio-economic paradigm', aligning significantly to CRC networks, in which:

> '*Info/Techno-Socio* (ITS) systems seek to *program* (as opposed to *programme*) the relationship between technical processes and humans by digitizing performance *fidelity* and coding for repeatable *risk free* procedures in computer-control-spaces so that data and communication do not [temporally] contradict each other' [16].

Info/Techno-Systems [21] are seen to be ideal for achieving "in time" coordination by control and rule (CRC). By contrast Socio-Info/Techno systems are seen to be capable of enabling collaboration (CSI), "over time", in which:

> 'Socio-Info/Techno (SIT) systems stress the reciprocal interrelationship between humans and computers to foster improved *shared awareness* for *agilely* shaping the social programmes of work, in such a way that humanity and ICT [control] programs do not contradict each other' [18].

Based on this understanding of the Cyber combining both CRC / ITS and CSI / SIT networks, it is considered Cyber- may be defined as:

'A technologically bounded, largely immeasurable, strongly scientific, stochastic control space; comprising virtual-media and the display of data dealing with the *real* communication of *facts* and the *conceptualization* of other plausible possibilities, themselves capable of generating *strong* physical and *weaker* more social effects and *influencing* them' [22].

III. JURISDICTION AND JURISPRUDENCE

We consider *Jurisdiction* (from the Latin *ius*, *iuris* meaning 'law' and *dicere* meaning 'to speak') as the *practical authority* granted to a formally constituted legal body to make pronouncements on legal matters and to administer justice within a defined *legal environment*. It also refers to the inherent authority of a court to hear a case and to declare a judgment and the [sovereign] power to govern or legislate; make or enforce laws and the power / right to exercise authority in that *environment*.

We take a more specific understanding of *Jurisprudence* (*juris prudentia*) as being about the *ecology* of law, including its *cultural* and *social* underpinnings. In this understanding, we consider jurisprudence as acting in two interconnected ways:

1. *Interstitial* issues of law as a social organization and legal instrument relating to the local political, sûréte (considered in the French as including assurance, sureness, trusts, reassurance, safety and security) and economic (PŜE) [23] global social ecology in which it functions.

2. *Existential* issues of law as a *social institution* and *legal system* relating to the *global* political, sûréte and economic social *ecologies* in which it *functions*.

A. Statutory / Codified (Roman) Law and Common Law

We identify two predominant systems of law:

1. Common (Customary) Law is a *system* of laws originating from the English *Commonwealth* (or 'common weal / good') and based on court decisions, on the doctrines *implicit* in those decisions, and on *customs* and *usages* rather than on *codified* written laws. It is underpinned by a *jurisprudential* body of law responsible for *socializing* judicial *decisions* and *customs*, as distinct from those of *statute* law. Common-law courts base their decisions on prior judicial pronouncements rather than on legislative enactments. Under the doctrine of *stare decisis*, common-law judges are obliged to adhere to previously decided cases, or precedents, where the facts are substantially the same. Customary *practice* allows common law to *adapt* to the local *ecology*; at the same time, stare decisis provides certainty, uniformity, and predictability and makes for a stable jurisdictional *environment*;

2. Civil / Codified (Statutory) or Roman (Latin) Law is a legal system originating in Western Europe, intellectualized within the framework of 'late Roman law' (the Code of Justin overlaid by Germanic law and local *environmental* practices). The most prevalent feature is that its core principles are *codified* into a *referential* jurisdictional *system*, which serves as the primary source of law. This contrasts with 'common law systems' whose intellectual framework comes from judge-made *decisional* law giving *precedential* authority to prior court decisions. *Codified* or *Statutory* law is written (as opposed to oral or customary); set down by a legislature / legislator and approved by its law creating *jurisprudential* body. Conceptually, codified law proceeds from social *abstractions*; to formulate general *environmental* principles that distinguish *substantive* (formal / *statutory*) from *procedural* (informal / *customary*) rules. It holds case law to be secondary and subordinate to statutory law. Consequently, the judicial *ecology* is socially *inquisitorial* and *unbound* by precedent.

IV. LAW AS NETWORKS

From the above *systems* analysis it is possible to consider three different network *ecologies* operating across the law:

1. *Network Law* we consider to be: programmable / downloadable and to exist within current jurisdictions; connecting between existing jurisprudences and jurisdictions. It is codified / programmed entirely or largely by CRC / ITS systems, in which the main interaction is between IT, and IT and human users – with minimal involvement from the legal system, lawyers and solicitors.

2. *Jurisdictional Networks* we consider to 'have the authority and responsibility for making pronouncements on legal matters; administering justice within a defined *jurisdiction*; declaring judgments; legislating and enforcing laws *in time* within that *environment*. They are a distinct *entity* or *being* contained within existing jurisdictions and *connecting* between them and different jurisprudences – and which may create and have value by combining / *synthesizing* the existing historical legal codes, for example Common and Customary Law'.

3. *Jurisprudential Networks* we consider to be: '*entities* and *beings* with a responsibility for understanding the social and cultural underpinnings of the law. Over time these networks influence law and allow it to adapt to change, they promote *collaboration*. The concern of such networks is with law as a *social* organization and law as a *social* institution'.

A. Jurisdictional Networks

We consider legal networks as they may be applied through Common and Statutory legal systems through the associated executive, legislative, judicial and enforcement bodies. In this respect, we identify four *hard* coordination, rule and control *jurisdictional* networks: the *executive*; the *legislative*; the *judicial* and *enforcement*. In democracies, the executive is provided by the elected ruling party and the legislative by parliaments elected to hold the ruling party to account and to legislate. This forms the *legislative*

jurisprudence. Responsible for implementing (the statutory legal system) and interpreting (the customary legal system) laws and connecting between the executive, the legislative and enforcement bodies is the judiciary. This forms the *judicial* jurisprudence. The third jurisprudence is provided by those responsible for enforcing civil legislation – which in most states includes policing, taxation, border, health, defense and social services administration. This is suggested to be the *enforcement* jurisprudence. Figure 1 situates the different legal 'beings' as vertically integrated, with the *public* jurisprudence – the conversation of public opinion and consent – lowermost. Also shown are the two different codes of law: one, Codified / Statutory Law, which is more top down; the other, Common / Customary Law, which is more rhyzomic. Significantly, the *judicial* jurisprudence in both codes interprets and makes *social sense* of the law either through *inquisition* (Codified) or *precedence* (Common).

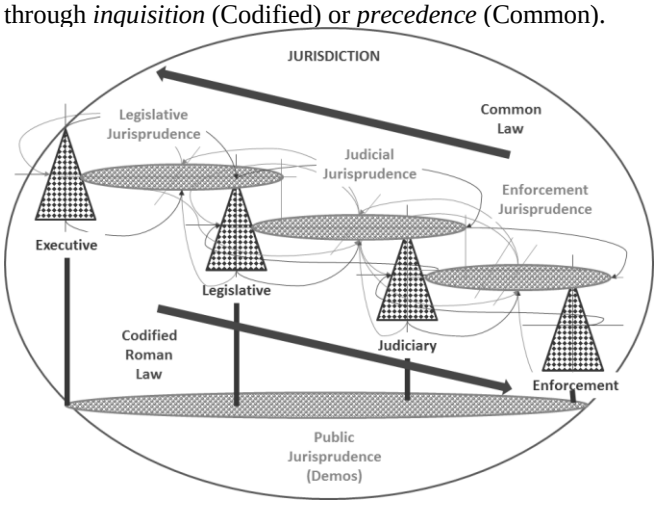

Figure 1. Jurisdictional and Jurisprudential Bodies

B. Jurisprudential Networks

We can identify three principal jurisprudential networks, the legislative, the judicial and enforcement, see Figure 2. At first glance this appears similar to the jurisdictional networks we identified. We do recognize that their responsibilities overlap. However, the jurisdictional networks are concerned with coordination and control (rank), while the jurisprudential networks are concerned with collaboration and influence (position). Examined from a horizontal perspective, *jurisprudential* responsibilities may be considered more in terms of position (than rank) and overlapping areas of responsibility. Significantly, this view also situates the Law within its *civil*, public and *social* settings. The *inquisitorial* and *precedential* interpretative roles of judicial jurisprudence also become clearer. Judicial jurisprudence connects between both *legislative* and *enforcement* jurisprudences. Specialist *soft* (informal) jurisprudence networks are identified to exist between the legislative and the judicial and the judicial and enforcement networks. We call these *Statutory* and *Customary* Jurisprudences. From a *Customary* and *Statutory* Law position, this analysis also identifies the priority given to the different judicial environments. Under *Statutory* Law, precedent is given to formal / codified rules and then to informal / customary ones. The position is reversed under *Common* Law, which gives precedent to informal *customs* and then to formally *codified* laws (the principle of *stare decisis*).

This research reinforced the position that 'for understanding and implementing cross-jurisdictional decision *making* and *taking* one needs to understand the different jurisprudences'. More precisely, one needs to interact at the jurisprudential level between both codes and specifically with the *statutory* and *customary* jurisprudences. This is not always well understood – for example, the continuing struggle between the English Courts and British Parliament in implementing European Court of Human Rights statutes. Most significantly, it is the social and collaborative *jurisprudential* networks that enable the Law to be *seen as*, *shared* and practiced *justly*.

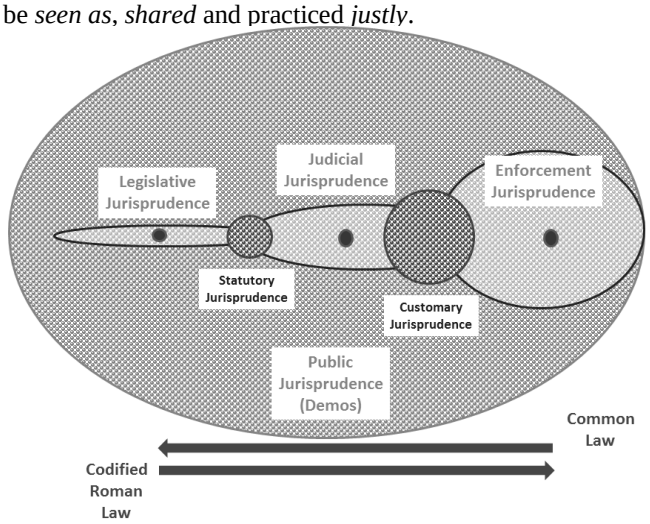

Figure 2. Jurisprudential Networks

V. Decision Making and Taking

At its heart, decision-taking is about the decision-making process – how, who, what, where and when. In this ideal world, strategy is primarily about 'observation' and 'orientation', while 'decision' and 'action' are best left to tacticians and operatives. However, in the 'real' world, strategists have to take account of all the factors impinging upon their strategic environment and no strategist can possibly operate in isolation – there is a social and network component to their knowledge, underpinned by the (social) strategic planning processes and the (personal) cognitive ones [24].

As connectivity and the availability of information has increased, this has often impacted negatively upon the ability to take and to make effective decisions. The science of decision making and taking examines the basis of effective decision-making and decision-taking in complex systems so as to adequately differentiates between the two [24].

There is a morality / ethicality to the decision making and taking process that is not always understood and rarely

articulated [24]. Considering Boyd's simple OODA Loop (Observe, Orient, Decide, Act) [25] there are essentially two loops contained within the one. One loop (Loop 1) is the observe-orient-decision-make loop; the other the decision-take-act loop (Loop 2). Together, arguably, they preserve a moral and ethical basis with decisions being made and taken based upon the available facts and the three relatives (3Rs: time, timing and tempo):

Loop 1 may be the home of the diplomat, the public servant, the researcher, designer and planner [26]. Loop 1 can be described in terms of its focus upon the methodology, on managing the loop from observation (experimentation, for example) through to orienting the structure appropriately for a decision to be made. The danger in Loop 1 is its focus on the levers and structures of power not necessarily the agency / and agents necessary to implement and carry out its decisions or inform its designs [24].

Loop 2, by contrast, concentrates on decision-taking and action with no previous research or observation, scant regard for theory and philosophy and believes largely in the delivery of action through agency / agents in order to exploit the results. This is the home of the Neo-Cons (advocates of the use of force, manipulation and deception of national / international affairs to promote rapid (democratic) political change / adoption of free-market policies; including by military means), who focus on action as a means of changing the status quo in their favor and breaking existing structures, methods and processes they see as constraints to their behavior. Their emphasis is on controlling the perception and the narrative as a means of coordinating and dictating the process and methodology [24].

In an adaptive ecology, one would expect the decision making and taking process to be continuous. After Bunge [27] (who considers knowledge as social), the collaborative social, *decision making* phase may be described more by CSI / SIT networks, while the *decision taking* phase may be described more by coordination, rule and control (CRC / ITS) networks. In a legal setting, it may be suggested that the *jurisprudential* networks provide for reflection and adaptation and the *jurisdictional* networks the necessary order for coordination and control. This recognizes work by Gray [28] and Luttwak [29] 'that places emphasis on the importance of *strategic culture* in *networked social processes* and which underpin planning, *decision-making* and so *decision-taking*: good decisions are not capability driven' [30]. It is often these reflective, social networks that are *sacrificed* to *optimization* regimes that concentrate on *objective* metrication [18].

VI. Cyber-in-Law

Zadeh [31] noted *decision making* and *taking* has been dominated by Probability Theory, while Clark et al. [32] suggested that 'a new mathematical model, based upon vagueness, fuzzy sets and partial possibilities [dealing with uncertainty], may be required to advance the science'. Additionally, Pólya recognized the relative ease of statistical programming for verification 'has tended to favor the heuristic [evidence based] reasoning of the mathematician rather than the inductive reasoning of the physicist' [33].

Cyber may be seen to consist of both the internet and the social networks that the internet supports; connecting between two poles. One sub-system may be identified and classified as being by **"**Coordination Rule and Control (CRC)" (akin to Network Law) (*explicit*); the other described as being through "Collaboration and Social Influence (CSI)" (akin to Jurisprudential Networks) (*implicit*) [34], [35]. These system attributes provide the necessary and "requisite variety" [4] to enable both control, "in time", e.g., Just In Time (JIT), and influence [36]-[40], "over time".

Our research indicates that understanding the connections between these poles involves *Fuzzy Logic* (FL). Emerging from Probability Theory (PrTh) with its binary logic-sets Zadeh [41] put forward Fuzzy Logic where 'linguistic variables with a truth value ranging in degree between 0 and 1 may be 'managed by specific functions'. Its main conceptual difference with PrTh, is that *Fuzzy Logic* considers degrees of truth; *vagueness* (in terms of lack of specificity and not knowing precisely); *partial truth*; *partial possibility* [42] and *uncertainty*. Whereas, standard Probability Theory deals with the stochastic – thereby global – partitioning of certainties; not the understanding of partial possibilities or partial truths:

'Viewed through the prism of partiality, probability theory is, in essence, a theory of partial *certainty* and random behavior. What it does not address – at least not explicitly – is partial truth, partial precision and partial possibility – facets, which are distinct from partial certainty and fall within the province of fuzzy logic. This observation explains why PrTh and FL are, for the most part, complementary rather than in competition' [31].

Noting the linkage between PrTh and FL since the 1990s Zadeh [31], recognized: 'the concerted drive toward automation [and control] of decision-making in a wide variety of fields [e.g., Cyber]…A side effect…is the widening realization that most real-world probabilities are far from being *precisely* known or *measurable* numbers'. Tong [43] had previously concluded that: 'Fuzzy models can be made to work…and, even in more complex situations (more variables or less data for example) they could capture basic behavior'. He considered them relatively simple to construct, being themselves quite simple structures whose greatest value lay in communicating process to others, where the linguistic value of a highly complex [Bayesian] model is doubtful. Tong went onto to suggest that fuzzy models are perhaps 'most valuable as tools for understanding basic characteristics rather than as detailed descriptions of process [and control] behavior'.

In law we may consider a road speed limit as an example of compliance / control by reason of certain sanction. Generally, people obey for fear of a fine if caught going over the limit [44], and the speed limit may result in a reduced number of accidents caused by speeding. We do not question the need for formal hard rules; every network needs such rules to operate *efficiently* [45]. A concern may be the extent to which it is possible to promote good behavior, including

in Cyber and beyond state-based jurisdictions, based simply on Law. The set speed limit may not promote responsible driving; it may simply ensure people do not go over the speed limit; indeed, it may simply promote driving at the speed limit in all situations, regardless. Traffic conditions vary for many different reasons requiring drivers to *make* and *take* decisions about speed. In this case we are dealing with a complex system, for which a hard rule cannot regulate behavior. Hence, as noted, the resort to more fuzzy concepts [46] for dealing with *uncertainty* in more complex ecologies, such as exists in Cyber. We posit that it is the *trust* and confidence of CSI principles that are central to *influencing* people to act in a good and collaborative way – particularly in areas of uncertainty where reflective *learning* plays a key role. In saying this, we do not doubt that well-formed principles of CRC / ITS may help, particularly as regards to enforcement and providing guidance as to *fail-safe* protocols and procedures. We also note, though, that even enforcement agencies are influenced by CSI / ITS principles as they, too, are parts of the jurisprudential networks.

VII. Stateless Jurisdictions and Changing Ecologies

Strong signal controls drown out the *weaker signals* necessary for innovation and adaptation in a number of ways. The most significant way they do this is to create norms-of-behaviour that tend to award compliance to rules and conformity and punish those who think differently, are awkward and challenge the consensus [24]. This is where *managed diversity* (for all its obvious goods) trumps the requirement for *complex variety* [35], necessary to innovatively problem solve and control [4], [47], [48].

A *weak signal* decision mathematically can have the same strength as a *strong signal* decision; however, it also has some very different and unique characteristics [24]. Because of the lack of *resistance*, questions of *time*, *timing* and *tempo* vary – in other words, there is limited resistance to be overcome and, indeed, the main challenge is to allow for *reasoning* and the *reflective capacity* [49] – necessary for *episteme* (*making* possible the structures / apparatus necessary for *taking* a decision) based, not on the separation of the true from the false, but upon what may, or may not, be characterized as *empirical* [50].

Because of the lack of *knowing*, it is not so much about providing persuasion as providing the reasoning for making a decision, informed very often more by *intuition* (the ability to comprehend without inference and / or the use of reason). Because of the weak signals and potentially *fleeting* nature of the decision to be *taken*, it is not a question (as for strong signal decisions) of doing one activity in isolation / or by constraining the other, e.g., freezing persuasion and reducing resistance. Decisions in the *weak signal* context need to have in place the *structure*, agents and agency necessary for *reasoning* – and for both *episteme* and *intuition* [24].

In two recent areas of research, the authors applied principles of *uncertainty*, *instability*, and *good faith* in relation to *statelessness* in terms of a Joint Venture case analysis and a green star accreditation system for building processes. In this respect, we see *statelessness* relating to the law; to nation states; the cyber and social / physical states of matter – or Metaphysics. In conditions of statelessness and of high uncertainty and instability, there exists the possibility of phase changes as new emergent structures condense to articulate and define new beings.

Uncertainty applies to probabilities, as in a Risk Register and to physical measurements that are already made, or to Donald Rumsfelds' *known-unknowns*, *unknown-knowns* and *unknown-unknowns* (US DOD news briefing, 12 Feb. 2002). Specifically, we consider *Uncertainty* to:

> 'Arise in partially observable, opaque, stochastic environments / non-ergodic (complex) ecologies, overly prescribed, ruled or controlled (ergodic) regimes as well as due to lack of assurance, *instability*, ignorance and / or lack of caring and shared awareness; including indolence' [51], [52].

Instability can create Uncertainty and Uncertainty can create Instability but they are not the same thing, Instability may be considered as:

> 'The quality or state of being *unstable* and / or the tendency to behave in an unpredictable, changeable, *uncertain*, or erratic manner' [51], [52].

We suggest that the *entangled* nature of *trust*, *risk*, *uncertainty* and *instability* become apparent through the lenses scoped above. With respect to a joint venture (JV) or collaborative process, we may consider it as a journey into the unknown, where exploration and innovation is required that may not be prescribed, ruled or controlled. At its heart, therefore, a JV collaboration may necessarily be based upon good faith which we posit (in this regard) as being:

> An expression of implied intent to explore the establishment of a *trusting*, *collaborative*, shared aware relationship between one or more parties involving the temporal suspension of *disbelief* that one party may have towards another party's raison d'être, rationale, modus operandi, concepts or ideas. It especially involves having all parties thinking that the other party's intentions are *certain* (within the kirk established), benevolent, *trust-worthy*, competent, good, honest or true.

We reconstructed a famous case in New South Wales, Australia involving a Joint Venture, *Coal Cliff Collieries Pty Ltd v Sijehama Pty Ltd* [53]. The case involved a number of negotiations commencing in the mid-1980s and culminating in an ultimately unsuccessful JV some 5 years later. Our reconstruction of events was based upon factors and relationships considered to influence a given joint venture (represented by a matrix, S), the permanent function of the matrix is an indicator of the level of uncertainty associated with a specific stage the process [54], [55]; based upon similar work by several researchers [56] used in calculating the uncertainty of a Performance Measurement (PM).

With relation to this *Coal Cliff Collieries*, a 5×5 matrix, S, was developed using a Likert type [57] scaling to represent the major parties and their partners in the joint venture along with the existential factors that we presume created the conditions for seeking such an agreement in the

first instance. From this a Decision Measurement (DM) was assessed based upon levels of uncertainty at each stage of negotiation for the Heads of Agreement (HoA) and the Joint Venture, the HoA was expected to deliver, see Figure 3.

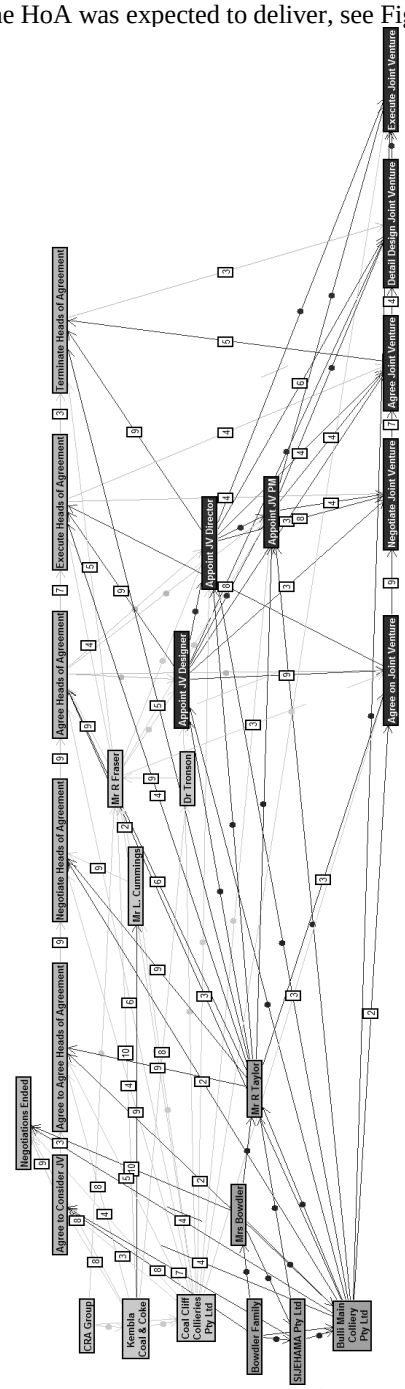

Figure 3. Longitudinal Concurrent Heads of Agreement and Joint Venture processes with downstream appointment of Joint Venture Designer; Joint Director and Project Manager (read bottom to top)

We determined that the JV negotiations broke down not through lack of rules and processes but due to the lack of trusts necessary to enable collaboration and shared awareness and so collaboration through an *uncertain* decision making / taking exploratory process.

By inserting trusted agents at key moments of the negotiation to better represent all parties (rather than applying rules and processes) it was found that uncertainty in the process could be 'brought under control' and, as a result, a satisfactory conclusion arrived at. In this instance, rather than collapsing to high degrees of uncertainty, the JV may have ended successfully in a new company / enterprise entity forming, see Figure 4.

In a separate study [58], see Figure 5, we considered two parallel (essentially disconnected) processes in the building industry, the build process; and, the Green Building Council for Australia (GBCA) Green Star programme for 'developing a sustainable property industry for Australia by encouraging the adoption of green building practices'. The aim (or mission) of the GBCA is to: 'develop a sustainable property industry for Australia and drive the adoption of green building practices through market-based solutions'[1].

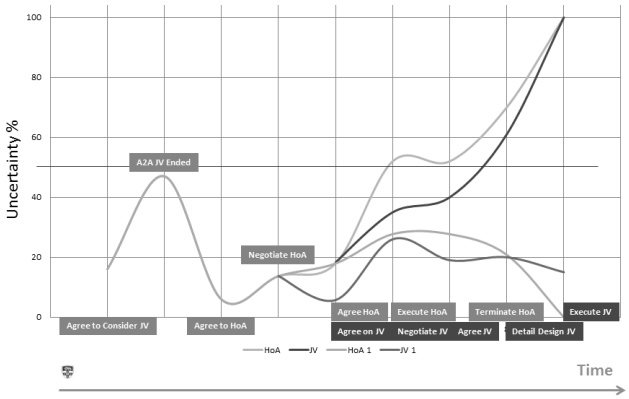

Figure 4. Heads of Agreement and Joint Venture Concurrent Processes Uncertainty Index, read left to right

Research was supported through the interview of over 25 building industry subject matter experts, considered levels of uncertainty at each Decision Measurement (DM) stage.

From Figure 6, it will be seen that, whereas the build process commences with a relatively high DM Uncertainty Index and that this increases initially, uncertainty in the process then reduces to a more manageable banding around the 15-20% uncertainty level.

The GBCA process, by contrast to build and design, appears much more *unstable*, with wide *uncertainty* swings of between 10-75% and with limited stability from one stage to the next. For planning purposes, this suggests that the current system may be unmanageable – without a foundation to predict (due to its inherent uncertainty) and / or to influence (since there is limited opportunity for collaboration) outcomes. For example, the GBCA Design Award is assessed at 50% *Uncertainty* – a basis of prediction that would be as precise for tossing a coin as following due process. Unlike the Build process, which creates opportunities for local, collaborative delegation of responsibility and authority, the GBCA process holds control

[1] Green Building Council for Australia (GBCA) Website, http://www.gbca.org.au/ visited Aug 2014.

through a limited number of players that largely disables feedback, while requiring reach-back to individuals and records (not held by the process) as the project develops.

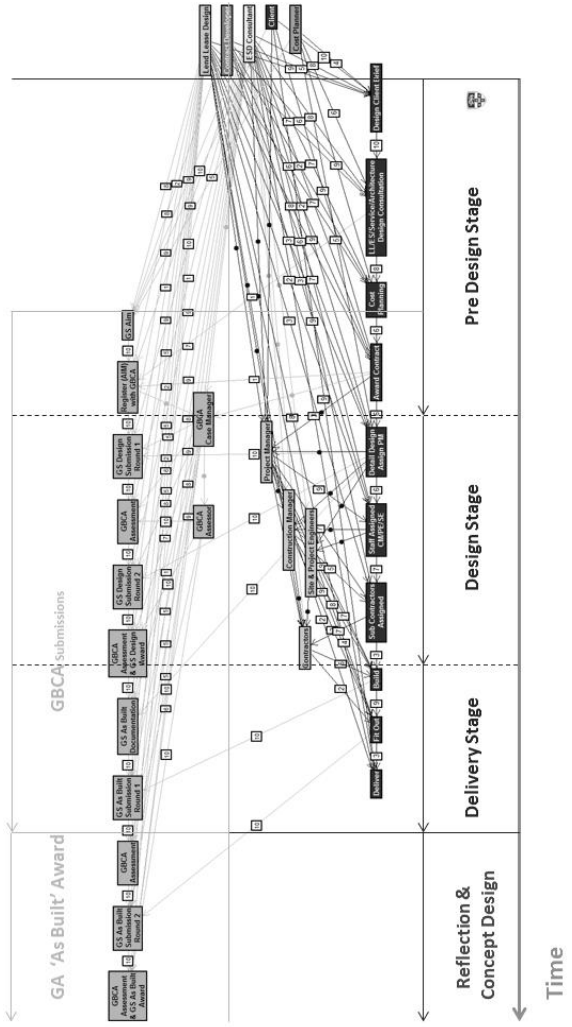

Figure 5. Build and GBCA System Processes (read top to bottom)

In addressing the failures of government and collective (collegial) intelligence prior to 9/11 and the Iraq War, the US 9/11 Commission [59] and the (Lord) Butler Enquiry [60] identified that overly controlled or formalized organizational structures such as those existing before 9/11 had not simply atrophied but had become 'tuned out' – no longer able to select between the vital weak-signals of innovation, adaptation [61] and change [62] (as threat or opportunity) [9] and the strong-signals of method [63] and process [64]. Recommendations arising from 9/11 [59] and the Global Financial Crisis were three fold: first has been to require greater transparency, for example, between the banks, investors, borrowers and governments; secondly, has been to demand greater regulation and thirdly, to move away from the need to know control model towards what has been described as the three needs model – need to know; need-to-share; need-to-use (3NM) [17].

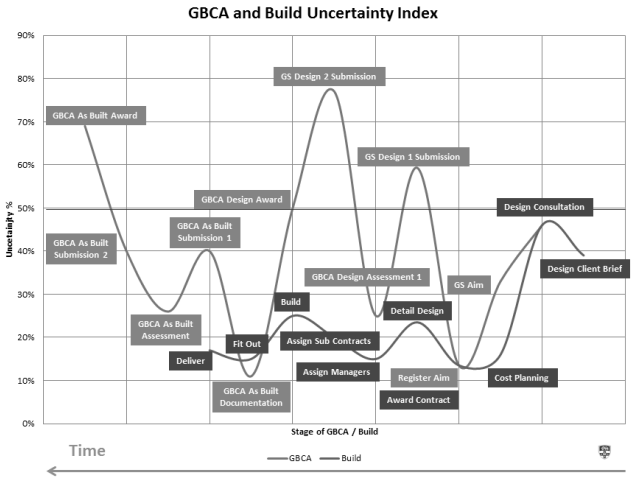

Figure 6. Build and GBCA System Uncertainties, read right to left

A control system identifies noise as risk and seeks then to remove it. Similarly, administrative processes and legal constructs based upon certainties seek to remove the noise – or uncertainty – from the system to achieve a degree of certainty against which legal judgments – based upon facts after the event – have been established. In a social setting, however, these same uncertainties can represent both noise but also the weak signals of innovation and change – potentially, as in 911, of threat also. *Uncertainty* – or rather manageable levels of uncertainty – can consequently be a good; enabling change and adaptation over time by testing the organization. If that ability to adapt or change by testing the ecology – in this case the ecology of a coal mine – are removed or constrained, then the ability for innovation, exploration, change and adaptation may also be impaired.

We readily accept that there are many examples of where people obey hard legal rules with the clear intention to comply with the law either because it is the law or because of the sanctions that may be imposed on them for contravening the law. Indeed such compliance may produce good results. A road speed limit is a typical example of such compliance by reason of sanction, people generally obey the limit for fear of a fine if caught going over the limit [44] and the speed limit may result in a reduced number of accidents caused by speeding than would be the case if people were left to judge for themselves the speed they should drive at in any particular circumstance. Moreover, we do not question the need for formal hard rules; every network needs such rules to operate efficiently [45]. Our concern is with the extent to which it is possible to promote good behavior through law. The set speed limit may not promote responsible driving; it may simply ensure people do not go over the speed limit, indeed it may simply promote driving at the speed limit in all situations. Traffic conditions vary for many different reasons requiring drivers to make decisions about speed, a hard rule cannot regulate behavior here as it is a complex environment and hence, as noted, the need to resort to more fuzzy concepts to promote thoughtful and good behavior whether it be driving or regulating a joint venture [46].

Collaborative processes, such as JVs, are a journey into the unknown and therefore require a degree of *trust*, *stability* and *certainty* in the proceedings. At the same time, an overly-prescriptive legal context may well deny those trusts forming in the first place and so the stabilities necessary to 'let go' and move to the next stage. As a result, the joint venture becomes fixed and frozen and can no longer move up or down – like a sailor afraid of heights clinging to the mast as their ship closes the rocks. We suggest that inherent within leadership and management is the ability to manage uncertainty and to identify those points of stability and agreement against which progress can be safely navigated [45].

Uncertainty above 50% would appear to be unmanageable and so, if not already, an unstable basis upon which to negotiate [54], [58]. Particularly a negotiation that, at some point, needs to focus on the identification and classification of its ecology; its standardization and ultimately upon the optimum and efficient delivery of a new company or organization – in this case a colliery. Optimizing upon uncertainty would simply be nonsensical and highly unstable – like our sailor letting go of three limbs and holding on with the fourth! At the same time, absolutely no uncertainty and no noise or dynamics within the system would appear to rule out any opportunity for innovation, from which change and adaptation might occur. This would suggest, empirically, that successful joint venture / collaborative processes may be those that seek to allow for uncertainty between, say, 15 and 40% and establish the structures necessary to allow for trusted debate in such a context [54], [58].

In management settings, we can identify two forms of leadership and management structures: the one more vertical and aligned with control type hierarchies typical of industrial / clockwork armies, such as fought in 1914; the other more horizontal, based upon trust and collaboration [24], [45]. In joint venture / award processes (such as GBCA), there is a need for a higher degree of collaboration and trusts to deal with the uncertainty and so create points of stability against which a successful venture may be founded. In other management structures, this might count as noise and so disrupt highly optimized manufacturing processes. The problem appears not to be controls or the law, per se, but who, where and when we choose to apply it.

The problems to be solved are very often not static and do not yield to a technique of 'thinking about it for a long period of time' because the ground upon which it sits continuously shifts. The application of complex theory provides valuable insights to how decisions are made and taken and importantly how to influence decisions. This is of vital importance in areas of human endeavor that defy regulation solely by command and control type regimes / processes. In particular, we are thinking of spaces that might be termed 'Stateless Jurisdictions' and which we see as operating according to principles of 'Network Law'. In these conditions of statelessness and of high uncertainty and instability, there exists the possibility of phase changes as new emergent structures condense to articulate and define new beings. Beings such as a successful joint venture that form from stateless or near stateless combinations to create a new entity. We maintain that the mathematics and legal conditions / rule-based processes enabling the emergence of such entities is entirely antithetical to those pertaining for 'steady state', stable type regimes. In fact, as argued in this paper the rigid application of 'steady-state' conditions and constraints can destroy the bases for such condensations to form. It is in these stateless spaces that we need to be able to encourage good behavior and trusts to form in a way that is to the benefit of the whole rather than simply forever punishing bad behavior and, ultimately, encouraging further the 'flight to cyber'.

In studies (one *dynamic* (*GBCA*) and one *retrospective* (*Coal Cliffs*)), it was possible to identify when and where uncertainty and thereby instability might occur [54]. In the event of the Coal Cliffs JV, it was shown that by introducing collaborative agents at a key point in the negotiations, that this could be instrumental to successful delivery of the JV and completion of the Heads of Agreement. In this respect, it may be possible to instrument negotiations in such a way as to forecast or even predict when interventions may be necessary to reduce uncertainty and so improve instability. In the GBCA study [58], through dynamic social network (DsN) and uncertainty analysis, it was possible to examine both the build and GBCA Networks and to make recommendations to improve collaboration / shared awareness. This would involve sharing trusts and thereby risks between both parties and, at the same time, creating a knowledge hub or Librarian type position that would retain knowledge of the process and previous builds, over time – rather than re-inventing the wheel, every build. This was contrary to industry expectations, which had posited improvements might be required within their communities, alone [58]. Research also pointed to an interesting dynamic relationship between *uncertainty* and *efficiency*. Industry was looking for efficiency gains and not understanding why the process could not be made more efficient. Research indicated that uncertainty in the process (see Figure 6) simply made any attempt at optimization untenable – it would be a bit like optimizing on moving ground. The process could only be made more *stable* and less *uncertain* by improving collaboration between the parties [58]. Only then, the system could be *optimized* and so made more *efficient*. Provided, of course, *optimization* did not remove the agents responsible for the retention and management of knowledge (which is not the same as KM!), so typical of Performance Management regimes.

The science dictates that hard controls and rules will always fail as emergent networks are too fluid and their rapid ability to adapt and change will simply by-pass static rules and regulations [54]. Regulation of behavior in such jurisdictions or the influencing of behavior that promotes the making and taking of good decisions for the individual and the network requires the harnessing of legal / process standards that promote reflection and an understanding of how they can be deployed throughout a network. This is the subject of future work.

VIII. New Ecologies

We consider that in an *adaptive* system, the decision making and taking processes are continuous and part of an ecology constantly *testing* for both success and failure – so as to avoid catastrophic degradation (the deleterious / undesirable deterioration of a ecology; including destruction of ecosystems and extinction of system-networks). The law and certain process regimes (often used / applied by Government on industry / the private sector) can be seen as a fixed immovable, post-hoc (after the event), *metricable* [measurable] object, like a castle. Examined from a *jurisdictional* point of view, the *objective* of law / processes such as the GBCA [54], [58], can be seen as 'controlling in order to rule' based upon the *representation* of evidence (data). The means have become the ends and the jurisdiction drives the strategy. What constitutes jurisdictional or process *knowledge* in law and control-engineering is not the same as what constitutes *knowledge* in strategy and so decision making and taking [24]. Strategic knowledge in Law is vested within its *jurisprudential* social networks as it is within the social *techné* (expert 'know how'; subjective knowledge of how to 'changes things') and *phronesis* (reflective wisdom, which provides plausible explanation and guidance in times of uncertainty') contained within any successful organization [54]. It is this co-*adaptive* knowledge that is so important in understanding decision making and taking [24].

We contend that there is a need in the 21st Century, to 'put humanity back in the loop', and that people will be employed more often in those *complex* lacunae where no amount of control, rule or coordination will *make* sense. We also see these as being the vital decision making and taking *commons* fundamental to delivering timely laws; design; strategies; and, policies that will prevail / pervade 'over time'. We also recognize that *resilience* does not come from the info-techno-socio control type networks but from investment in *socializing* and capitalizing our socio-info-techno influence networks. One cannot understand these *complex* systems without understanding their underpinning networks and how they are managed and *controlled*; *influenced* and *led* [24]. Understanding how Law interacts at the project, unit, *jurisdictional* and systems *influence* and *jurisprudential* levels is therefore important. Not simply to aid understanding in times of crises, but to provide sustainable future programmes and to enable timely, collaborative, social responses to shocks and uncertainties, be they human-made or natural.

We consider Network Law as a *hard* entity contained within existing *Jurisdictional Networks* and *connecting* through IT between them and different jurisprudences [54]. We suggest that they may have specific value in combining and synthesizing historical legal codes, such as Common and Codified Law. We do not advocate new laws, for example, for Cyber, but for improved understanding and the establishment of connecting *soft* networks – hence, *Jurisprudential Networks* – to better socialize connections between existing jurisdictions, *Network Laws* and the cyber-internet – specifically in areas of uncertainty and potential instability, for example, a collaborative process of Joint Venture [54], [58]. It is in the area of Cyber and Law that this paper makes a contribution and which, based upon the principles derived and outlined in this paper including for Fuzzy Logic and Fuzzy Law, which the authors are taking forward for application and future development.

Acknowledgment

We acknowledge Lend Lease and the Royal Australian Navy and in particular the Faculties of Law, Arts and Social Science, the Centre for International Security Studies and Engineering and Information Management & Technology at the Universities of Sydney and Hong Kong.

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