

What light is shone by (certain) economic theory on Digital Rights Management?<sup>1</sup>

*Abstract.*

*This paper utilises the work of Carl Menger in an attempt to (a) objectively understand and define the information management practice that is commonly described by nomenclature such as DRM, and (b) utilise the knowledge gained through such a process in order to question the justification that appears to support the use of the practice. The moral philosophy of David Hume is also utilised in aiding the suggestion that the practice is unjustified.*

---

**Overview.**

- 1. Introduction.**
  - 2. Identifying the practice.**
    - 2.1. Things, useful things and goods.**
    - 2.2. The precarious nature of goods.**
    - 2.3. What follows.**
    - 2.4. The importance of the quantitative relationship.**
    - 2.5. The system of management.**
  - 3. Information as thing, useful thing and good.**
    - 3.1. A short digression concerning the role of exclusive ownership in the creation of goods.**
    - 3.2. The important aspect of the technologies of information use.**
  - 4. The changing nature of the technology of information use.**
    - 4.1. New technologies of information use and their economic effect on information.**
    - 4.2. The effect of the new technologies of information use.**
    - 4.3. The result of the subversion of the quantitative relationship.**
  - 5. The fundamental objectives of the practice.**
    - 5.1 The second objective and the creation of value.**
  - 6. A critique of the practice.**
  - 7. The assistance of Hume**
- 

---

<sup>1</sup> Alan Cunningham, Herchel Smith Research Scholar, Queen Mary Intellectual Property Research Institute, University of London. e-mail: a.cunningham@qmul.ac.uk.

## 1. Introduction.

A certain management practice is developing and occurring, a management practice that is concerned with how copyright works are to be distributed, supplied and utilised in the digital and/or distributed communicative environment. Attempts at pithy descriptions of this practice can be illustrated by reference to such simplistic, and misleading, (but eternally popular!) terms as Digital Rights Management (DRM), or Technological Control Measures (TCM). Such terminology, and other descriptive endeavours that merely reference the technologies involved in the practice, do no justice to isolating and explaining the fundamental purpose of the practice. In fact their continued and common use ensures that the core objectives of the practice are left unstated and, thus, unexplored. In this fashion, the continued use of such terminology, and such descriptive methods, is detrimental to a true understanding of the practice and, importantly, to allowing any subsequent appreciation of the benefits or problems surrounding the practice that might result from such an understanding.

The *first* purpose of this paper is therefore to attempt to establish an objective understanding of the practice, without reference to specific technologies or attractive acronyms. By concentrating on the fundamental concerns of the practice, irrespective of the copyright work or controlling technology in question, a clear model of this practice can emerge, reduced to an abstract core of principled objectives. This approach provides one with a beneficial understanding of the practice, and, as a result of such understanding, a suitable frame through which to explore the benefits and problems of the practice. It also provides some further analytical satisfaction by virtue of the stability of its nature. Specific technology changes rapidly; the objective of technology is mundanely static. Concentration on that aspect ensures an appropriate analytical methodology.

In order to create an objective model of the practice, certain economic theory is employed. The justification for such employment is that the management practice is, quite obviously, an economic response to certain economic problems. Specifically, the practice is a response to the economic *effect* of certain changes in the technological circumstances of society on information goods. Considering the practice as such, one must look to economic theory to explain what it wants to achieve as an economic riposte to economic problems. The economic theory utilised in this paper in order to ascertain the objectives of the practice, and thus provide a suitable model of it, is certain aspects of the work of Austrian economist Carl Menger as outlined in his seminal, but somewhat forgotten work, *Principles of Economics*<sup>2</sup>. The choice of Menger, and this particular work, was, initially, quite unintentional. The simple truth is that on first reading his work, I began to notice a distinct method of analysis concerning the economic nature of things, of how they obtain goods character and value, and, most importantly, of how the scarcity of goods in relation to the needs of society determines their requirement for management, that appealed to some of the difficulties I was having in crafting a suitably abstract understanding of the economic practice in question. I decided to see if I could go further with this initial connection, and feel that his work is most beneficial in this context, especially to the (non-economically trained) legal academician.

Utilising economic theory to explore the nature of the response personified by the practice allows for the establishment of an objective model of it, as shall be

---

<sup>2</sup> Menger, C. *Principles of Economics*, Libertarian Press, 1994.

## WORK IN PROGRESS

illustrated. However, this process has additional benefits, which allow the *second* purpose of the paper to emerge. It was previously suggested that an inappropriate understanding of this economic response ensures that assessing the benefits or problems associated with it is difficult. By establishing an objective model, however, one is in a much more suitable position to assess the practice, for good or for bad. Specifically, the process of employing the economic principles outlined above in order to model the practice also allows one to properly explore the justifications behind that practice. Such exploration allows one to suggest that the practice is potentially unjustified. Rather, it encourages the belief that the practice is actually an act of self-justificationary vested interest protection.

## 2. Identifying the Practice.

The first task in such a paper would usually be an initial and cursory identification of the practice in question. It is, however, difficult to apply the principles outlined in the introduction concerning the requirement for completeness and objectivity while providing a cursory and initial identification. This is the path on which we find the ubiquitous three-letter acronym. A better, although perhaps not so initially comfortable starting point, is to begin by simply stating that the practice, whatever it may be, is a remedy: a response to a problem. Our first explorative step should be, therefore, to determine exactly what that problem is, and why a response is required. Following this process will allow one to achieve some idea of what the response is for, and thus, is.

To begin to determine the nature of the problem the practice is responding to, what one can state without any lack of clarity is that the practice is specifically and exclusively employed in a particular environment: a digital and/or distributed communicative environment. As the practice is employed solely in this arena, these two technologies of information use<sup>3</sup> are, as is undoubtedly commonly known, therefore key aspects of the problem. To provide some initial illumination on this perspective, suffice to say that these two technologies of information use have a particular (and from the perspective of a copyright holder, problematic) *economic effect* on information goods that are distributed, supplied and utilised upon them. The existence and nature of this economic effect of these two technologies of information use may be well known to many. Nonetheless, some further elaboration surrounding their problematic status is a useful and necessary starting point for this paper, given its initial sub-objective of ascertaining the nature of the problem to which the practice responds, (which will thus allow achievement of the initial objective, an understanding of the practice itself).

### 2.1. Things, useful things and goods.

To restate, it is not actually the technologies of information use that are problematic *per se*, but the particular *effect* they have on the economic character of information that is distributed, supplied and utilised on these media. The effect of such technology is problematic because the economic character of a good, in particular how it is perceived and used by society in relation to its needs/wants, has an impact on how it is required to be managed. Therefore, if a certain technology acts to effect change in the economic character of a good, such as information, it is obviously problematic for those who have control over the good, since they will have to re-assess the nature of their control. Therefore, when it is suggested that it is the economic effect of technological circumstances that the practice is a response to, it is more correct to state that it is the effect on goods character that it is responding to. Goods character, as shall be illustrated, greatly determines the requirement or non-requirement of legal instruments as systems of management. Elaboration of these points, in order to better understand the nature of the problem to which the practice is a response, requires further discussion of the concepts of goods and how they are required to be used and managed by society. It is at this point that the work of Menger is useful, since he has provided some insight on these topics.

---

<sup>3</sup> The term 'technology is information use' is an inclusive one, incorporating technologies of information use, storage, promulgation etc.

In his *Principles*, Menger began his exploration of goods by painstakingly clarifying an understanding of such concepts as things and useful things and how they become goods, and subsequently exploring the justification for their requirement to be managed, by instruments of law, as economic entities. This process is an aspect of his general theory of the good and his discussion concerning economy and economic goods.

Menger began, simply, by suggesting that *things*, general actual or ideational objects, can be placed in a causal connection with the satisfaction of *needs*, and that such things can therefore be considered as *useful things*. Here, Menger is reflecting the 'great principle' that states that 'all things are subject to the law of cause and effect'<sup>4</sup>, for if one passes from a state of need to a state of satisfaction, certain causes must exist to explain this change. As such, the main thing that can explain any positive change in the process of satisfying needs is the cause of this change, and a suitably *useful thing* for society to have in existence.

While things can become useful things, however, useful things can themselves also be transformed, dependent on further causalities. Specifically, they can become *goods*. However, Menger suggests a useful thing can only become a good if it satisfies certain criteria. First, obviously, a human need must exist for the useful thing. Second, such properties must exist that allow the useful thing to be brought into causal connection with the satisfaction of the need. Third, there must be knowledge of this connection. Finally, there must be command of the thing sufficient to direct it to satisfying the need. Useful things that satisfy these criteria become goods, those things that have most potential for useful interaction with the needs of society, because society is *aware* of their effect in satisfying needs (aware of the causal connection) and also has the *power* to direct the useful things to this end.

## 2.2. The precarious nature of goods.

While one can therefore state that certain *things* exist that can satisfy our needs, and that these *useful things* can be directed, as a result of awareness of their usefulness, to the satisfaction of our needs as *goods*, goods are *nonetheless problematic* for society. Certainly, societies ultimate concern is the continual satisfaction of its needs; goods, however, those things that can alleviate this concern, require a constant *coercion* and *supervision* if they are to fulfil their destiny.

This requirement for constant coercion and supervision stems from two difficulties that impinge on goods and their role in satisfying societies requirements. The first difficulty is the pressure imposed on goods by the concept of *time*, specifically, the future. Determining how goods will be intelligently used requires an assessment of both their current and future level of availability and societies current and future level of need. For example, society could decide, in managing the process of directing useful things to satisfy its needs, that it would only make an attempt to maintain such goods in a state that that would allow the satisfaction only of their immediate needs. Obviously, that would be a very unsustainable and unsatisfactory situation<sup>5</sup>. If society is to flourish for a period more than that in front of its nose, it needs to plan ahead. As Menger has written, 'if we suppose the inhabitants of a country to be entirely without stocks of foodstuff and clothing at the beginning of winter, there can be no doubt that the majority of them would be unable to save

---

<sup>4</sup> cf. Menger (n 2 above), 51.

<sup>5</sup> As Menger points out, in such a scenario, 'the satisfaction of their needs, and hence their lives and well being, would be very inadequately assured'. cf. Menger (n 2 above), 78.

themselves from destruction, even by the most desperate efforts directed to the satisfaction of their needs'<sup>6</sup>. Future planning, in order to circumvent the constraints of time, is thus always required. As civilisations develop, the argument for providing for the requirements of the future becomes more achievable and, thus, more compelling, although still problematic. Even the most basic organisation of individuals, however, if they are to continue to direct useful things to the satisfaction of their needs, must be aware of the constraints imposed on such activity by the continual march of time and able to react, however simply, against it. This is the first difficulty in ensuring goods can achieve their role in satisfying the needs of society.

The second problem is the *ephemeral nature* of the majority of goods themselves, a result of their explicit tangibility, their physicality. Their tangibility ensures that goods are inherently scarce and inherently rival, and perfectly suited to being excluded from free and common use. Such economic characteristics ensure that society has difficulty in satisfying all of its needs.

These two factors, therefore, act to ensure that any specific *relationship* regarding the satisfaction of a societies needs, being inherently one between the availability of a specific good and the specific requirement for that good, is thus a *quantitative* one, one that is constrained by the quantities involved, of both time, amount and physicality. It is in this manner that goods exist in a precarious situation.

### 2.3. What follows.

The precarious nature of goods, the fact that they are continually at the mercy of the dangers imposed by inherently limited quantities, and the ravages of progressing time, requires some addressing, if society is to flourish and overcome these dangers. For Menger, the answer to this problem was obvious. Such goods become *economic goods*, goods that require careful management.

Economising is the natural response to these problems, since society will eventually become aware of the life-threatening impact of these problems and will, naturally, act to minimise their influence. Society will, therefore, undoubtedly decide to plan in advance, circumventing the restrictions of time. In attempting to provide in advance for the satisfaction of its future needs, society will, necessarily, first become clear about their level of *requirement* and about the amount of goods *available* to meet that requirement. An inherent and all pervasive requirement for economising of goods will become even more apparent after this initial reaction to the problems of time and physicality. For example, determining the future availability of goods in this way requires not only assessing the level of need, but also assessing the scarcity of a good. Although some goods exist in amounts greater than the need for them, and some goods exist in rough equality with the need for them, most goods are quite scarce and exist in a state where their availability is less than the need for them. In addition, while there may, admittedly, occur specific instances as mentioned above where goods *are* in abundance or equality with the requirement for them, all physical goods are, arguably, *inherently scarce* by design. This second point, allied with the usual practical scenario that ensures that generally, goods exist in quantities *less* than the desire for them, leads to the societal realisation regarding goods which is that, as Menger suggests, 'no part of the available quantity, in any way practically significant, may lose its useful properties or be removed from human control without causing some concrete human needs, previously provided for, to remain unsatisfied, or without causing these needs now to be satisfied less

---

<sup>6</sup> cf. Menger (n 2 above), 78.

completely than before'<sup>7</sup>. This realisation of the existence of immense responsibility when dealing with goods ensures that society is always aware that if it wishes to satisfy its needs as completely as possible, it must continually strive 'to maintain at its disposal every unit of a good standing in this quantitative relationship (my addition: *this quantitative relationship between the amount of a good and the level of requirement for that good*) and to conserve its useful properties'<sup>8</sup>. Furthermore, on becoming aware of this quantitative relationship between goods and needs, society becomes aware that, inevitably, part of societies needs will always remain unsatisfied and, importantly, any unsound employment of such goods will result in needs that would, otherwise, have been satisfied remaining unsatisfied. These factors ensure that goods that exist in a quantitative relationship with needs must be economised, or managed.

#### **2.4. The importance of the quantitative relationship.**

The quantitative relationship then, the relationship between the availability of a good and the level of want/need for that good, is key in determining whether a useful thing that can be directed, due to societal awareness of its usefulness, toward satisfying a need, requires management in order to achieve this objective. The obvious question is: What is the most appropriate system of management to combat the instability imposed on society by the existence of quantitative relationships?

#### **2.5. The system of management.**

Menger suggests that the system of management will be (a) a system of exclusive ownership of goods and (b) property rules that determine the terms and limits of such ownership. This system emerges as most appropriate because, given the inevitability that certain needs of society will remain unsatisfied as a result of the effect of the quantitative relationship, 'human self-interest' ensures that if the amount of goods is not sufficient to satisfy needs, individuals will 'attempt to ensure their own requirements as completely as possible to the exclusion of others'<sup>9</sup>.

In so attempting to ensure requirements are met at a private and individual level, some individuals will succeed and others will not, success or failure largely decided by the accidents of natural ability and ravages of fate, unpalatable as that may seem: 'the requirements of some members of the society will not be met at all, or will be met only incompletely'<sup>10</sup>. As such, society becomes composed of those who have nothing, those who have something and those who have a lot. The have-nots become opposed to those who have-some, the have-somes are envious of those who have a lot. This natural 'opposition of interest' ensures the necessity of protecting individuals who possess goods subject to quantitative relationships from removal by force, since this may well occur. The rationale for such a mechanism of justice is rooted in natural self-interest, for if you respect what another has, he will also respect what you have, ensuring that even those who have a limited amount are ensured of protection. For Menger, this explains the use of the principle of exclusive ownership (accepting an exclusive ownership of a certain good), and the property rules and doctrine that regulate such ownership.

---

<sup>7</sup> cf. Menger (n 2 above), 95.

<sup>8</sup> cf. Menger (n 2 above), 95.

<sup>9</sup> cf. Menger (n 2 above), 97.

<sup>10</sup> cf. Menger (n 2 above), 97.

## WORK IN PROGRESS

A system of economic management thus results from the disparity between the amounts of goods available and the want or need for such goods, from, in essence, the existence of the quantitative relationship. The system of management acts to address the difficulties present in ensuring that the fundamental concern of society, the satisfaction of needs, is itself satisfied.

In effecting such distributive justice, this practice of management ensures that the difficulties that emerge from societies awareness and utilisation of *things, useful things* and *goods*, are kept to a minimum. The important point to keep in mind here is that the main reason why goods become economic goods, thus subsequently requiring the application of systems of management that can ensure some degree of stability of possession and some degree of distributive justice, is because they exist in a quantitative relationship concerning their level of availability and the want or need for them. In this respect, the notion of the quantitative relationship is vitally important in justifying the application of law to this problem, as a system of economic management in light of scarce resources.

All of the above has been stated in a protective context that is exclusive to *physical* goods. Earlier it was pointed out that the practice in question is a response to a certain problem. The problem is the economic effect that certain technologies of information use have on *information* goods. It was initially suggested that this was a problem because, the nature of a good, how it is perceived and used by society, its economic character, has an impact on how it is required to be managed; therefore if new technologies were changing the economic character of information, those people who owned information goods might want it changed back, or addressed. Hence, the existence of the practice. In order to understand and appreciate this general suggestion, that the economic character of a good justifies its manner of management, some exploration of the work of Menger concerning things, useful things and goods was undertaken. Such an exploration allowed the specific suggestion that the existence of a quantitative relationship can, as discussed above, justify the application of exclusive ownership to certain goods. This suggestion is, however, (at least thus far) only vitally important in explaining and justifying the application of exclusive ownership and property rules to physical goods. However, the practice is not concerned with physical goods. It responds to the problematic economic effect of technological circumstance on information goods. We therefore need to look at how information exists as a good, and how it is required to be managed. By doing so one can understand what changes technological circumstance has made to the good character of information, how this has affected the management requirements of information goods, and why this is a problem the practice needs to respond to. All of this will act to further develop a proper understanding of the practice.

### 3. Information as thing, useful thing & good.

One can quite easily suggest that information is a *thing*. It can also be easily considered as a *useful thing* since it can be brought into a causal connection with the satisfaction of a human need. Information can also be considered a *good*, since society has long *realised* that information can be brought into causal connection with the satisfaction of needs, and has long had the *ability* to direct information to that purpose. In these respects, information is entirely similar to *physical things*, useful things and goods.

However, we have established that physical goods are *problematic* for society, since, while societies ultimate concern is the continual satisfaction of its needs, physical goods that can alleviate this concern require a constant coercion and supervision if they are to fulfil their destiny. Hence the requirement for the application of exclusive ownership and property rights to physical goods.

The important question at this stage is this: Do information goods suffer from the same requirement for coercion and supervision? In other words, does the economic character of an information good act, in a similar fashion, to justify the application of exclusive ownership and property rules? Such instruments of management are required in the case of physical goods because time and physicality create an implicit quantitative relationship between the level of availability of a good and the want or need for that good. As a result, physical goods undergo a change in goods character; they become economic goods. The existence and subsequent problems of the quantitative relationship explains the requirement for applying exclusive ownership and property rules to these objects in order to effect distributive justice.

*At a first glance* information goods would not appear to suffer from the same malaise. Initially, one can point out (without yet addressing the important issue of the *creation* of goods, generally), that, once created, information is limited by the constraints of time to a *lesser degree* than physical goods, and not at all limited by the constraints of any physicality. Such characteristics would allow the initial suggestion that, perhaps, information goods *do not* require the application of exclusive ownership and property rules, since they would not appear to be constrained by the limits of a quantitative relationship.

This would be a difficult suggestion to uphold, it might appear, since the instruments of exclusive ownership and property rules have been, and are, applied to information goods. However, the common justification for such application is not that such instruments are required in order to address the problems of a quantitative relationship between information good availability and information want/need. Rather, it is that since information goods are non-scarce and non-rival, the application of such legal instruments of exclusion is perceived as providing a suitable incentive for the effort involved in their creation. The argument is that the non-scarce and non-rival character of such goods makes it hard to justify expending time, money and effort in the creation of such goods.

The use of this justificatory argument in order to explain why ownership of information goods is allowed is confusing, and problematic. How does it resolve itself with the perspective, implicit in the aspects of Mengers work that were previously discussed, that would suggest that information goods should *not* have exclusive ownership and property rules applied to them, because they do not appear to exist in a quantitative relationship? The answer to this problem is that both (a) the 'incentive' justification, the idea that information goods *should* have exclusive ownership and property rules applied to them *because* they are non-scarce and non-

rival, and also (b) the quantitative relationship *non-justification*, the idea that information goods *should not* have exclusive ownership and property rules because *they do not exist* in a quantitative relationship, are wrong. The true fact as to why exclusive ownership of information goods occurs is a compromise between the two. It is that information goods *do require* the application of exclusive ownership and property rules *but not* because such instruments are required as an incentive. They are required due to the very reason that Menger suggests they should be required - as a remedy to the existence and problems of a quantitative relationship between the availability of goods and the want/need for such goods<sup>11</sup>. Although this rationale might appear misplaced when talking about information goods, later discussion will illustrate that it is not.

Before upholding this argument (a process of discourse which will also discuss *why* the idea that information goods should *not* have exclusive ownership and property rules applied to them, because of the existence of a quantitative relationship, *is wrong*), the dismissal of the incentive argument requires further discussion. In order to do this, the issue of the creation of goods generally, and information goods in particular, requires some address.

### **3.1 A short digression concerning the role of exclusive ownership in the creation of goods.**

With regard to physical goods, I have utilised Menger in suggesting that the justification for applying the concept of exclusive ownership and property rules to physical goods is that distributive justice in relation to such goods is constrained by the existence of specific or inherent quantitative relationships, a result of the limits imposed on such goods by time and physicality.

This justificatory argument does not, admittedly, address the issue of the creation of physical goods. It simply suggests that legal doctrine is required in order to address a problem of goods management *ex post* creation. The avoidance of a discussion of what is involved in creating, or modifying, physical goods is problematic. Such an oversight can be easily explained. Since physical objects *do* ordinarily exist, regardless of the actions of humankind, one can easily be forgiven for thinking that no incentive is required for their creation. However, most physical objects, while existing independently of our actions, must undergo transition to become goods. Most physical goods that society finds useful must either be created, or at the very least have some time, energy and money involved in their existence for beneficial use in society.

A problem therefore emerges in upholding the aforementioned justification for the application of exclusive ownership and property rules to such goods i.e. that they are required because of the problems of the quantitative relationship. The problem is that since physical goods require creation or modification, one *can* argue that the application of exclusive ownership and property rules to goods occurs not as an *ex post* remedy to the problem encountered due to quantitative relationships, but in order to incentivise work to be undertaken in relation to goods so that they can be

---

<sup>11</sup> However, it is vitally important to note that the existence of the quantitative relationship in this case is externally imposed by certain societal circumstances, and not internally created by the information good itself. This distinction is integral in both explaining the practice, and questioning its justification, and will be discussed latterly.

created or modified. The result of this problem is that if the argument suggesting that exclusive ownership and property rules are required for physical goods because of problems between availability and want/need is to be seen as valid, the incentive argument requires addressing.

It is, in fact, easily rebutted. Physical goods can easily justify the effort and money invested in their creation or modification without reference to the application of exclusive ownership or property rules. Although instruments of law such as exclusive ownership can, retrospectively, act as a supplementary assistant in justifying the effort involved in the creation of physical goods, the fact that the goods are *physical* (and thus inherently scarce, rival and more suited to exclusion) is enough of an incentive in itself, without employing the benefits of a conceptual exclusivity and protective regime. The reason for this is that physical goods, *qua* physical, are naturally scarce and rival, and, also, easily excludable, an attribute which can extenuate these qualities. These factors act to ensure that society will feel comfortable in spending time, money and effort in creating and developing physical goods, since they can, initially, utilise the natural exclusionary nature of such goods to obtain the value from them that justifies their creation. The application of systems of management such as exclusive ownership and property rules comes later, addressing *not* the problem of incentivising the effort involved in creation or modification of such goods, but the problem of the disparity between the level of created or existent goods, and the want or need for such goods. This quantitative relationship places the pressure on society to protect those who have the possession of goods from those who have no possession and cannot find goods available to meet their needs. This explanation address the issue of incentivising the creation or modification of physical goods, but also illustrate that they very factors that act as an incentive also create the real problematic issue which requires the application of legal instruments. Admittedly, the application of legal instruments such as exclusive ownership subsequently acts to assist the creation of physical goods as an incentive, but this was not the *initial purpose* of the use of these instruments.

What about the creation of information goods? It has just previously been argued that, like physical goods, the justification for applying the concepts of exclusive ownership and resultant property rules to informational goods is that distributive justice in relation to such goods is constrained by the existence of specific or inherent quantitative relationships. Such an argument might appear misplaced, since it has just recently been suggested that information goods, once created, do not suffer from the problems of the quantitative relationship. Be aware, however, that that assertion is qualified by the statement "at first glance". Later aspects of this discussion will make clear how this conclusion is reached. First, in order to maintain this argument, it is required that the role of exclusive ownership and property rules in justifying the creation or modification of information goods be explored. This is because the typically utilised argument surrounding the application of exclusive ownership and property rules to information goods is that such instruments act as an incentive in the process of deciding to spend time, money and effort creating such goods.

It has been suggested that physical goods do not require the assistance of exclusive ownership and property rules in order to incentivise their creation, but rather to address difficulties subsequent to their creation. The reason suggested for this was that physical goods have an *inherent scarcity* and *rivalry*, and also a natural exclusionary nature, that can act *itself* to justify the effort involved in the creation of physical goods. It was pointed out that these inherent characteristics of scarcity and rivalry also subsequently act to create a quantitative relationship between the

availability of a good and the desire for that good, ensuring the *actual* requirement of exclusive ownership and property rules to effect distributive justice.

The central traditional argument posited regarding the application of exclusive ownership and property rules to information goods, is that, *unlike* physical goods, information goods do not benefit from an inherent scarcity and rivalry, and are more difficult to exclude. As such it is considered difficult to justify the investment of time, money and effort that are necessarily involved in the creation of such goods. As non-scarce goods any investment would be difficult to justify because the question can be asked: why create a good that upon creation is not inherently scarce – value cannot be obtained from it and, therefore, surely my time has been wasted? Similarly, who will pay to use a good if it is inherently non-rival? Simply find someone else who has one.

The ‘incentive’ argument suggests that by allowing exclusive ownership of certain information goods, and by applying property rules to regulate such ownership, society will feel more secure in investing in the creation of these non-scarce and non-rival information goods.

However, I believe that this argument is not a sufficient explanation as to why the application of exclusive ownership and property rules to information goods is required, and, thus, justified. The simple fact is that prior to any application of any system of management, society will create goods, and society will find *natural* and *actual* (as opposed to conceptual) incentives for the creation of those goods. For example, it has already been suggested that the inherent scarcity and rivalry of *physical* goods is considered enough of an initial incentive to create such goods even in light of the efforts involved in the creation or modification of physical goods. Similarly, it would appear that certain economic characteristics of information goods have a similar ability to act as an *inherent incentive* in light of the time and money involved in the creation of such goods.

The characteristics of information goods that have this ability do exist, but they are perceived only after a considered exploration of how information is useful to society, utilised in society, and what is essential for it to be useful and utilised. Quite simply, in order for information to be useful to society, or in order for it to be utilised, it has to be *capable of use*. The main method by which information is made capable of use, and is thus utilised, is the *technology of information use*. As previously mentioned, the term technology of information is an inclusive one, incorporating technologies of information storage, promulgation, expression and use. The term is also not technologically specific – the word ‘technology’ is used in the sense of an art or craft. Thus, for example, whereby the expression of an information good on paper by use of ink is quite obviously an example of a technology of information use, (and promulgation, expression and storage), so, also, is the human mind similarly a technology of information use. Such technologies of information use are absolutely necessary for information to be considered useful in society – indeed, in the case of the human technology, such technologies of information use are necessary for information goods to exist, since societies conception of information goods and their usefulness is necessarily constrained by our own existence. *Importantly*, as well as a necessary aspect of the useful life of information, technologies of information use add an *inherent exclusivity* to information goods, thus, like physical goods, acting as an incentive for the creation of the good itself. The actual exclusion offered by a technology of information use is, arguably, sufficient to provide the required economic incentive to create information goods. As an integral part of the life-cycle of an information good, the technology of information use is no mere contrivance on my part; it is an expected aspect of its life subsequent to its creation. In this respect, it

can mimic the stability of physical goods. Such stability offers an incentive to the would-be creator of an informational good, ensuring the possibility of the exclusion, scarcity and rivalry that make any good valuable and thus worth creating.

The technology of information use is therefore a vital aspect of this paper. It acts to negate the 'exclusive ownership-as-incentive' argument, by acting as a natural incentive for people to put time, effort and money into the creation or modification of information goods. It also ensures that our initial suggestion, made earlier, that information goods do not suffer from the same economic characteristics as physical goods, is somewhat incorrect. In this fashion it additionally provides the criteria that create the quantitative relationship between the level of availability of the information good and the want/need for the information good, justifying the application of exclusive ownership and property rules in order to effect distributive justice. If the practice is a response to a problematic effect of new technological circumstances on the economic character of information goods, perhaps it is a response a subversion of the very useful scenario that historical technologies of information use have created; the quantitative relationship. We look at this aspect, and its repercussions, next.

### **3.2 The important aspect of the technologies of information use.**

Arguably, then, technologies of information use offer the exclusivity to information goods that ensure there is sufficient actual incentive to create such goods. The technologies of information use are a necessary part of an information good, ensuring that information can be used, and are also useful in a different regard, in the sense that they provide the factors that ensure the creation of information goods. However, the technologies of information use have another vitally important effect on information goods. They drastically affect the economic character of information goods. In abstract, the economic character of information goods is that they are non-scarce, non-rival, and, although not impossible to exclude, less prone to exclusion due to their lack of physicality. However, once a technology of information use has been applied to an informational good, these economic characteristics change. It is such a change that ensures that an information good can, in the same fashion as a physical good, act as its own incentive for its creation, being scarce, rival and excludable. As a result of these new economic characteristics of information, the manner in which information goods are used and managed are re-determined. Specifically, what I am suggesting is that the economic character that results from the technology of information use can act to create a quantitative relationship, which, as pointed out earlier, can act to explain and justify the application of legal doctrinal instruments as management devices.

For example, consider the abstract informational good of the 1400's. The technologies of information use in existence at that time, constituting the best technology available, were ink, paper, the variety of writing implements and, arguably, language. Such technologies certainly made information more useful, but they also added certain economic characteristics associated with their tangibility to the intangible information good. Because the usefulness of the intangible good is determined by the technology of information use, the additional economic characteristics become part of the informational good. In this respect, the technologies of information use of the 1400's added a scarcity and rivalry to the informational good, by virtue of the natural exclusionary effect that flows from their

physicality. Importantly, they thus limited the economic use of the good, so that, for example, even if universal education was ecclesiastical and sovereign policy, it could not have been effected. In this fashion the economic effect of the technology of information use was to constrain how information is used and managed.

In fact, the fundamental effect of a technology of information use is the creation of a (however prosthetic) quantitative relationship between the availability of information goods (the technology of information use making information available, but constraining it) and the want or need for that information good (a want or need that increases due to the technology of information use, but which is constrained also by the technology of information use).

It has been illustrated that the existence of a quantitative relationship is vital in determining the justification for applying the instruments of exclusive ownership and property rules to goods of any sort. The most obvious criticism of this perspective, which suggests that exclusive ownership and property rules are rather required as an incentive, has been addressed. With regard to physical goods, it was pointed out that the physicality of such goods acts as a sufficient actual exclusionary device, offering an inherent incentive to either create physical works, or modify existing ones. The physicality that provides this incentive also acts to subsequently cause the resultant difficulties that are the actual reason why exclusive ownership and property rules are required: the existence of a quantitative relationship between the availability of a good and the want or need for that good. Exclusive ownership and property rules ensure distributive justice in light of this phenomenon, and while, in the case of physical goods, these instruments might have additional use as an incentive, this is their fundamental justification.

With regard to information goods, it initially appeared that, being non-scarce and non-rival, and less prone to exclusion, the incentive argument has more force in explaining why exclusive ownership and property rules are applied to information goods. However, the necessary technologies of information use, as much a part of an information good as the information itself, act to change that initial consideration. The technology of information imparts to the non-scarce and non-rival information good an explicit exclusionary aspect, creating scarcity and rivalry. This effect of technologies of information use can be viewed as as much an initial incentive as the inherent physicality of a physical good is. It provides any initial incentive for the creation of information goods, as the historical glut of information goods and the historical absence of copyright law can easily illustrate. Similar to physical goods, the exclusionary effect of the technology of information use also provides the real difficulty that acts to justify the application of exclusive ownership and property rules; a quantitative relationship between the availability of information and the want or need for information. Again, like in the case of a physical good, exclusive ownership and property rules provide distributive justice in the face of this difficulty; again, as in the case of physical goods, these instruments can be subsequently considered as acting as an incentive, although that was not the main reason for their application.

I suppose that the central argument in the case of both types of good is that actual exclusivity, providing scarcity and rivalry, will always predate the application of a conceptual exclusivity that can be provided by the instruments of law, and that therefore the use of instruments of law to provide distributive justice will also predate the use of law to provide any incentivising effect, since exclusivity inevitably leads to the quantitative relationship, which, if society is to function well, requires action.

#### 4. The changing nature of the technology of information use.

The physicality of a tangible good provides an initial natural and actual incentive for the effort involved in the creation of such goods, or in their modification. As an integral aspect of the good itself, it is unlikely that tangible goods will ever lose this physicality. As a result, such goods will have a continual incentive for their creation or modification; in addition, such goods will also continually suffer the difficulties that accompany the quantitative relationship that results from physicality, and will continually require the application of law as an instrument of management in response to such problems.

It has been illustrated that, in the case of information goods, it is the necessary technology of information use that provides the exclusionary effect that mimics the physicality of a tangible good. An integral aspect of the use of information goods, such technology acts as an initial and actual incentive for their creation, and ensures that information goods also suffer the difficulties of the quantitative relationship, thus requiring the application of exclusive ownership and property rules.

However, it is not unlikely that information goods could *lose* this physicality imparted by the technologies of information use<sup>12</sup>. The economic effect of the technology of information use is not a static unchanging effect (admittedly, it is possible to suggest that an actual quantitative relationship between the availability of a physical good and the want or need for a physical good is not a static event either, but the difference is that whatever the specifics i.e. greater than or less than, there is always an inherent quantitative relationship when dealing with tangible objects because of the limits imposed by their inherent tangibility). Most historic and current technologies of information use impose a scarcity and rivalry on the relevant information good as a result of their natural exclusionary effect. Yet not all technologies of information use have this effect. In fact, two relatively new technologies of information use have a radically different effect on the economic character of information. Before any discussion of the practice as response to such effect, some exploration of these technologies is of use.

##### 4.1. New technologies of information use and their economic effect on information.

The first new technology of information use is an innovative method developed for representing information. The method is known as *digitisation*, and its innovation in expressing information has resulted in the creation of a number of new and beneficial ways of storing and using information goods.

Some exploration of the philosophy behind digitisation is necessary in appreciating the effect it has on the economic character of information. The best way to begin this exploration is by first looking at binary arithmetic. This is useful, and necessary, because binary arithmetic is the core concept of digital systems. Digitisation is simply a method of representing data for communication along

---

<sup>12</sup> It is also possibly not unlikely that, in the most distant future, physical goods might lose the physicality they impart to themselves. I am particularly thinking here of speculative ideas such as the development of technological devices that can infinitely reproduce any object: “universal photocopiers”. Of course, unless an infinite energy source was discovered, such machines would themselves be constrained by quantities of energy. The problem of the actual creation of the machine could be bypassed easily enough if the energy source was infinite; the machine could simply make infinite copies of itself for common use by society.

specific means. Binary arithmetic is key in that process, itself being a particular method of representing information.

However, prior to discussing binary arithmetic, it will be useful to briefly explain the history of mathematical representation and the concept of bases. As binary arithmetic is merely a type of mathematical representation it requires appreciation in this context. George Ifrah has written a suitable account of the history of numbers. He places the origin of mathematic representation in primitive evolutionary periods, or prehistory. At this stage, the human race could only conceive of the quantity of things that existed in close proximity and could be determined by a glance. Ifrah points out, however, that such activity may have awoken in human society the idea of the “concrete aspects of objects which it directly perceived”<sup>13</sup>. As a result of this realisation, and aided by necessity and the development of natural intelligence, society may have been required, or able, to solve problems concerning these concrete objects that they encountered in their existence. Ifrah points out that the earliest methods of devising procedures for manipulating the concrete object which society found, was the representation of the notion of the concrete object on something equally concrete, such as body parts e.g. fingers. In time, communication of such representation may have been undertaken by speech and gestures. Ifrah traces the development of this process of such representation of concrete objects, suggesting that it would, in time, come to be both part abstract and part concrete, allowing for less and less of a reliance on a concrete body part to represent a quantity of a concrete object, and more and more on the idea of an abstract symbol representing the concrete object, the principle, in a fashion, behind the use of the body part. The abstract symbol, a notional number, would have become detached from the notion of concrete objects and bodily representation to become a general notion, applicable to any kind of thing. Ifrah suggests that the resulting necessity to make “a distinction between the numerical symbol itself and the name of the concrete object or image led people to finally make a clean break between the two, and the relationship between them disappeared from their minds”<sup>14</sup>. Ifrah establishes this era as when society began to understand of numbers in an abstract sense, and not necessarily in relation to concrete objects. Numbers thus became unrelated to tangible things, and became an intangible abstract thing themselves, an abstract thing that could be placed in connection with the solution of any number of problems.

A difficulty presented itself at this stage, however, and the solution to that difficulty can be viewed as another important step in the early development of mathematics. The abstract notion of a quantity of things, of numbers, was represented in a number of early different forms. The variety of methods of representing numbers created many difficulties, such as interoperability of representation systems. These difficulties were solved by the creation of the principle of the base of a number system i.e. a system of representing the abstract notion of the quantity of things that has a base of symbols used in that system. The Base system is a place-value system, where the value of the places are not arbitrary but determined by a very simple rule. The system has a finite number of symbols or digits that change their meaning in accordance to their position in a sequence of other digits. Thus for example, Base 10 (decimal), the now ubiquitous base, utilises the abstract Arabic symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, in order to represent quantities. Any number

---

<sup>13</sup> Ifrah G. , *The Computer and the Information Revolution*, Volume III, The Universal History of Numbers, Harvill, 7.

<sup>14</sup> cf. Ifrah (n 13 above), 8.

is represented by a string of these digits, for example, 3401. The value of the number is calculated by adding up the values of each digit in the string. The value of each digit in the string is calculated by multiplying the digit itself by the value of its position or place in the string. Each place has a different value: in 3401, the 3 is in the thousands ( $10^3$ ) position, the 4 is in the hundreds ( $10^2$ ) position, the zero is in the tens ( $10^0$ ) position, and the 1 is in the units (or ones,  $10^1$ ) position. Thus 3401 represents three lots of one thousand, plus four lots of one hundred, plus one lot of one. In general, each time we move one place to the left the value of the position increases by a factor of ten; hence this is a base ten system. It is considered that Base 10 emerged from the fact that most societies used their fingers in order to initially deal with the problems of concrete objects. As the abstract notion of numbers was removed from bodily parts, the Base 10 system continued, even though it may not be the most efficient system (and others have been used by history such as Base 60 – Babylonians, and Base 20 – Mayans.)

Which brings us up to Base 2, or binary representation. Binary representation is the representation of information, or data, by two symbols. These are the binary digits, 1 and 0. The philosopher Leibniz was instrumental in developing the idea of data representation via a binary method. Although somewhat misguided in his consideration of the Taoist conception of Yin and Yang as conceptually similar to binary representation<sup>15</sup>, Leibniz was correct in his perception that by utilising a simple system of two numbers, any number could be represented. This was his own discovery of base 2, or binary arithmetic, reflecting his exclamation "*Omnibus ex nihil ducendis sufficit unum*"<sup>16</sup>. It had its origins in earlier works of Leibniz's, notably, "*On the art of Combination*", which established a method for reducing all logic to exact statements. Leibniz considered that logic, or 'the laws of thought' could be moved from a verbal state - which was subject to the ambiguities of language, tone and circumstance - into an absolute mathematical condition. This is an early distinction between what is analogue and what is digital, and binary is central to digital. Leibniz wrote

*"A sort of universal language or script, but infinitely different from all those projected hitherto, for the symbols and even words in it would direct the reason, and errors, except for those of fact, would be mere mistakes in calculation. It would be very difficult to form or invent this language or characteristic, but very easy to understand it without any dictionaries."*<sup>17</sup>

Leibniz's original idea of a binary system of representation was ignored and forgotten for about 10 years until he read the hexagram sent to him by a Father Joachim Bouvet from China. The logic of the hexagram system appealed to Leibniz's conception of representing all logic in a universal mathematical condition. Thus the hexagram, which starts thus:

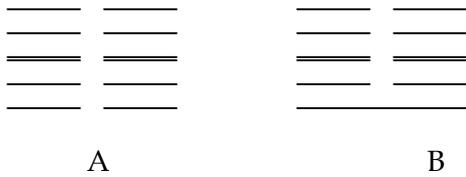
---

<sup>15</sup> Leibniz viewed the continuous (yang) and broken (yin) lines of the Tao as 1's and zeros, postulating that by means of such two numbers any number could be written. His postulation was correct but the assumption that the Taoist system was conceived with this in mind is misplaced. As Ifrah has pointed out, the Yin-Yang notation has nothing to do with binary logic – the Chinese had no conception of zero until very late in their history, and the number systems were decidedly decimal. All the Yin-Yang system has in common with binary arithmetic is that they each make use of two opposite symbols. As Ifrah writes, "the comparison stops here, since the binary number system, which is founded on a positional principle and uses a symbol for zero, is used to write numbers, while the Yin-Yang system was never used for writing numbers".

<sup>16</sup> "With one, everything can be drawn out of nothing".

<sup>17</sup> Leibniz, *On the Art of Combination*.

## WORK IN PROGRESS



Can come to be represented by the following

$$A = 000000 = 0$$

$$B = 000001 = 1$$

And so on. Leibniz took the Chinese system as confirmation of his theory, although as has been pointed out the similarities between the two are skin deep. He undertook other work on the binary system, most notably in *De Progressio Bydadica*, where he postulated the idea of constructing a binary calculating machine which would use moving balls, and *Explications sur L'arithmetique binaire*.

Leibniz was not the only 17<sup>th</sup> Century thinker to be concerned with how data can be more effectively represented. Francis Bacon, in devising a cipher for the letters of the alphabet utilised a binary combination of a's and b's, so that A=aaaaa, B=aaaab, C=aaaba and so on. If we replace the a's and b's with 1's and 0's, Bacons representation model corresponds with binary with A=00000, B=00001, C=00010, etc. Pascal also made advances regarding number bases, presenting to the French Academy of Science in 1652 his paper on "The divisibility of numbers deduced solely from the sum of their digits". Here, a general definition was provided of a number system to an arbitrary base m, where m can be any whole number greater than or equal to 2. Such advances in the abstract representation of data led to greater work into the binary system, and its benefits for computation and arithmetic.

From the 17<sup>th</sup> Century toward the 19<sup>th</sup> many philosophers and mathematicians discussed and explored the binary system. This can be considered in the context of trying to establish more efficient methods of calculation; as Leibniz has written "it is unworthy of excellent men to lose hours like slaves in the labour of calculation which could safely be relegated to anyone else if machines were used." In 1837, however, with the creation of the telegraph by Samuel F. Morse, the wonderful possibilities offered by the binary system of data representation were finally illuminated. Morse's creation represented the earliest system that utilised electricity, and electrical impulses based on a specific binary code, to transmit messages of information across electrical wires. As Ifrah has pointed out, however, the Morse Code in strictly speaking not a binary system but a ternary system, at base 3. It has three symbols that are used to represents data; a short sound followed by a short silence, or dot; the long sound also followed by a short silence, or dash; and the longer period of silence which indicates the completion of the dots and dashes which encode a single character. However, what the telegraph and Morse illustrated were the benefits in abstract representation of data combined with the ability to mirror such abstraction electronically. This concept would spark the computing revolution. In deed with the advances in the understanding of electricity and electromagnetics later in the 19<sup>th</sup> Century and beginning of the 20<sup>th</sup> Century, the possibility of using electrical circuits in order to communicate data took another step forward. One of the greatest inventions during this period was the flip-flop, a device consisting of circuitry that allowed the creation of bi-stable circuits, where the state of the various components could be reversed. The discovery of the properties of this device lead to the construction of the earliest binary electronic circuits, a process which allowed us to arrive at the stage of digital technology today.

All of these advances allowed the important distinction to be drawn between analogue mathematical representation and digital mathematical representation, and it is in this fashion that digitisation has an important effect on the representation of information. Analogue representation is a method of obtaining answers to mathematical problems by means of measurements carried out on a physical surrogate for the problem itself. A physical system – an analogue, from the Greek *ana* “according to” and *logos* “ratio”, meaning proportional to - is used in order to represent the problem at hand and aid in its solution. For example, the first considered analogue machine was the odometers of Greece, which were designed to compute distance. They did so by representing the problem at hand, the distance to be measured, on a *physical model* analogous to the scenario. In this case it was a series of worm-gear trains which were moved by the rotation of the chariot wheel and in return moved an indicator needle on a scale, representing units travelled. This was an analogue machine. In time, such analogue machines became analogue computers, “devices in which the variables occurring in the problem to be solved are represented by continuously variable physical quantities whose values are constrained by the device so as to obey the same mathematical or physical laws as in the problem to be solved”<sup>18</sup>. For example, the classic analogue computer is the abacus. Of course, there are numerous problems with such a method of representation. Given that the analogue device is a physical model for a particular problem, it will never become a universal device that can be used for all manner of arbitrary problems. Analogue devices impair the ability to store information and results. They are also inexact in their results. This is in direct contrast to the digital mode of representation. A digital system of representation, and hence a digital computer, represents data by way of a “discontinuously variable physical phenomenon which can be represented in a one-to-one manner in a discrete form, namely by digits or other symbols subject to precise laws of combination which thereby form what is called a code”<sup>19</sup>. Here I must offer a considered clarification – I agree that analogue representation depends on a physical surrogate that mirrors the tangible and flexible real world event. I also agree that that digital representation offers a more reliable discontinuously variable approach. However, the digital approach at representation is not founded in purely physical phenomenon, but in symbols and numbers which are products of the mind, abstraction that are used only to represent data. In this respect there is a considerable difference between analogue which utilise physical matter to represent the data, and digital, which uses abstractions, information goods, to represent the data. Admittedly, digitisation depends on physical energy in order to represent information by abstraction. However, permitting for this constrain, digitisation still has a drastic effect on the economic character of information goods.

The second relatively new technology of information use is the distributed communications network, commonly known as the Internet. The Internet is a misleading term; what is being referred to is a very simple communications system. The manner in which this distinctive communication system allows information to be used is extremely relevant to the argument put forward in this paper.

The communication methodology that the ‘Internet’ embodies emerged as a result of military and technological necessity. The military issue was the nuclear threat posed by the Cold War enemies of the United States. Nuclear technology was a specific danger to US communication systems, which, even in the event of a complete nuclear attack, were expected to be able to allow the military to communicate and co-ordinate a response. In light if this expectation, the military wanted a communication system that was impervious to such an attack. Such desire required technological changes. The communication system that existed prior to

---

<sup>18</sup> Verroust, G. *Structure d'un automate algorithmique universel: l'ordinateur*. Seminaire du CNSNSM, CNRS, Orsay, 1965, p. 158

<sup>19</sup> cf. Ifrah (n 13 above), 162.

distributed communications was based on the concept of concentrated and hierarchical switching of information packets, such as a telephone conversation. The technological design of the system was the cause of worry for the military, as it was particularly weak to a nuclear missile attack. Under this concentrated and hierarchical concept, a telephone call, for example, would be sent firstly to a local office, then to a regional or national switching office if a further connection were required. In this concentrated system, a direct military attack on the single local office would lead to the unavailability of communication for those dependant on the local office. Conversely, the distributed communications system that was to be developed<sup>20</sup> as the technological response to this military problem would have many switching offices (or nodes), and many links between the nodes. Thus in the distributed system, a direct hit on one node would not damage the ability of the entire communications network to operate. The concept was developed in order to achieve a totally redundant system, impervious to military attack but still offering excellent communications. The manner in which this system was built ensured that it would have an interesting effect on information utilised on it.

Responsibility for developing this distributed communications network fell to the Advanced Research Projects Agency (ARPA) of the Department of Defence. One major aspect of ARPA's objectives assisted in the evolution of what was to soon become the ARPAnet. This was the role of ARPA in funding and co-ordinating university research on computing issues of military relevance. As a result of this responsibility, certain sections of ARPA wanted to see an effective pooling of resources surrounding the computing research centres. The notion of pooling technological resources is described by Abatte as emerging from 'inspiration and need'<sup>21</sup>. The inspiration arose from the mind of a man called Joesph C.R. Licklider, the Director of ARPA's Information Processing Techniques Office. Licklider was convinced of the possibility of what he called the 'man-machine symbiosis'; the combining of human intellect to computing machinery, thus allowing the processing of data not known on any previous scale. Part of the practicality of enacting a 'man-machine symbiosis' was the successful creation of interactive computing, and Licklider began to pool the resources of the university research centres in search of true interactive computing. The need element in this equation resulted from the economic and technological reality of the time. Computing machinery was not only vastly expensive in the 1960's; it was technologically limited. If a researcher wanted to perform two different types of computing tasks, he might be limited not only by the cost of a machine that could complete the tasks, but by the fact that two machines, equally expensive, might be technologically required to complete the project. If however, a way could be devised that allowed a researcher to access computing technology at another centre, without travelling there or purchasing a machine itself, both technological and financial restraints could be circumvented.

All of these factors lead to the development of a co-operative computing network that utilised the distributed communications principles developed by Paul Baran at RAND. The development of such a distributed communications network required further technological innovations in order to produce the desired effect. Layering of communications, interoperability standards, protocols for the free movement of information all ensured that co-operative communication could be effected and that communications was assuredly distributed. A free managerial style,

---

<sup>20</sup> By a RAND researcher called Paul Baran, in a paper entitled 'On Distributed Communications'.

<sup>21</sup> Abbate, J. *Inventing the Internet*, MIT Press, 2000.

and the academic environment in which the ARPAnet was designed also assisted in the development of a system that, simply, wanted information to move as freely and effectively from one point to another. Of course, over time, as commercial interests emerged, the architecture of the distributed communications network has come to reflect certain different regulatory objectives. The important aspect to remember, however, is that the fundamental objective in the construction of the technology was to free access to information and encourage its movement in a more efficient manner. As such a technology, it has a vital effect on the economic consideration of information goods.

#### **4.2. The effect of the new technologies of information use.**

The effect of these two technologies of information use, utilised separately or, as is commonly the case, combined in use by digital and distributed communication networks, on the economic character of information, has been extremely interesting. It would possibly be hyperbole to suggest that they totally re-assert any non-scarce or non-rival elements of information goods. However, such technologies do have a distinct effect on the economic character of information goods. They re-awaken the ability of information to be non-rival; they re-awaken the ability of information to be, once created, non-scarce. Such characteristics are admittedly limited by the constraints of energy and actual technological devices, but if adequately provided, information certainly becomes relatively non-scarce and non-rival, and much more difficult to exclude. These new technologies of information use are also interesting in that, while they make created information goods less scarce, less rival and more difficult to exclude, they also act to increase the usefulness of the information to a much greater degree than previous technologies of information use. Perhaps this is due to their peculiar economic effect on information goods. However, the most important result of these technologies of information use is their fundamental effect: that *they subvert* the effect of historic technologies of information use, which is the imposition, in a necessary fashion, of a quantitative relationship between the availability of information and the want or need for information. These new technologies of information use mean that if one wants a certain piece of information, it will generally be easily available. Since, as has been discussed, the existence of the quantitative relationship acts to require and thus justify the application of exclusive ownership and property rules to information goods, and since historic technologies of information use have provided such a relationship, the question that must be asked is: What is the result of this recent subversion of the quantitative relationship?

#### **4.3. The result of the subversion of the quantitative relationship.**

If one recalls the elements of Mengers work that were discussed previously, it was suggested that the existence of a quantitative relationship between the availability of a good and the want or need for a good can act as an important economic justification for the application of such systems of management as exclusive ownership and any resultant property rules. An inherent quantitative relationship follows tangible goods everywhere, whatever the relative specifics of a given availability/want and need scenario. In relation to information goods, historic technologies of information use have supplied an exclusivity that creates scarcity and rivalry, in turn creating a quantitative relationship between information availability

## WORK IN PROGRESS

and information need/want. This exclusivity is a central part of any information good, because without a technology of information use, information is practically useless. Importantly, two new technologies of information use do not supply a similar exclusivity, thus not creating a quantitative relationship. The economic effect of these new technologies of information use is therefore worrying for those who, benefiting from the application of exclusive ownership to information goods because of past particulars, want to see such ownership respected in the context of these new media. Although, arguably, ownership will generally still be respected, if such copyright owners decide to attempt to distribute and sell their works in this new technological environment, the distance between the benefit of conceptual exclusivity, offered by law, and actual exclusivity, offered by technology, will begin to appear, as it already has. Without the support of actual exclusion, the conceptual exclusion of the law is shown fiercely wanting. Interestingly, this point acts to further illustrate that the application of exclusive ownership and property rules to information goods is required less as an incentive and more as a response to the disparity in the distribution of goods that results from the quantitative relationship. It does so because the current scenario illustrates that without actual exclusion, conceptual exclusion means nothing - and if so, it is pretty dubious that exclusive ownership would have been suggested as a sole system of incentive. I cannot imagine anyone suggesting to a modern day creator of a copyright work that a conceptual exclusion offered by copyright alone should encourage him to create a work to distribute on the Internet; he will want, if he is a rational maximiser, technological exclusion, because it is more initially useful. The main role of law is as an *ex post* remedial device, either in order to ensure distributive justice, as has been argued, or restorative justice, in the case of a dispute.

The fundamental problem is that the technological circumstances that previously merited the application of such systems of management to information goods, and thus justified their application, no longer exist. In this fashion, one can perhaps begin to imagine how this paper will explore the potentially unjust nature of rights management systems. However, this discussion of economic concepts has been primarily concerned with first unearthing the fundamental objectives of this practice, a concern to which the paper now necessarily returns.

## 5. The fundamental objectives of the practice.

At the beginning of this paper it was pointed out that what is required is a generic model of the practice in question, comprised of an abstract core of principled objectives. It was also stated that economic theory would be employed in creating such a model. The justification for this process was that since the practice itself is an economic response to economic problems, economic theory would be best suited to exploring it and modelling its objectives. The sections of the paper previous to this one have outlined most of the economic theory and principles that are of use in beginning the process of establishing a generic model of the practice, although such a model, and what is comprised of, has not been mentioned for some time now. It is to this aspect of the paper that we now return.

It has been stated that the practice is occurring in a particular technological environment comprised of digitisation and/or distributed communications. It has been stated that these two technologies of information use constitute the difficulty to which the practice is a response, or rather, they produce an effect on the economic character of the thing, useful thing and good that is information that causes difficulty for right owners. The difficulty is that the manner in which a good is perceived as used by society determines how it will be required to be managed. As a result of our exploration of Menger, it was discussed that tangible goods exist in a precarious scenario; they are continually required by society, but limited by time, amount and physicality. As a result of this, such goods exist in an inherent quantitative relationship between their availability and the want or need for such goods. This quantitative relationship makes distributive justice difficult; the response, as posited by Menger, is economic management. Specifically, it is the employment of exclusive ownership and property rules that regulate such ownership. The discussion of what was required in relation to physical goods was instrumental in providing the background and establishing the method by which to explore information goods, the effect technologies of information use have on such goods, and the requirement for application of exclusive ownership and property rules to information.

It is the precarious existence of physical goods, constrained by time and physicality, that justifies the application of instruments such as exclusive ownership and property rules. When one considers information goods through the lens of Mengers discourse on tangible goods, their precarious situation, the quantitative relationship and the requirement for economic management, one might initially conclude that information, while a good, is not in such a precarious situation and management not required. Information is, in any initial and cursory analysis, non-scarce and non-rival, therefore arguably not able to exist in a quantitative relationship and not requiring the application of legal instruments of economic management to effect distributive justice.

As has been suggested, the only argument that can possibly be made (on acceptance of this initial and cursory analysis) concerning why exclusive ownership of information goods is permitted, is that because information is non-scarce and non-rival, it requires an incentive for its creation that is offered by the conceptual exclusion of law. However, it has been pointed out that a fundamental aspect in the consideration of the life-cycle of information goods is that they are continually, and necessarily, allied to physical technologies of information use. It is these technologies of information use that have historically acted to impart a necessary *quantitative aspect* to information, making it useful, but restraining it economically. In this fashion, these technologies of information use limit the availability of distributive justice regarding information goods; they create a disparity between the availability

of information and the want or need for an information good. Because of this, information goods require, in the same fashion as physical goods, the application of exclusive ownership and property rules; importantly, such application is not required in order to incentivise their creation, because the technology of information use, as well as creating the quantitative relationship, also creates the initial exclusivity that encourages the investment of time, money and effort in their creation.

However, we concluded with the point that two new technologies of information use, digitisation and distributed communications, act to subvert this historic effect that technologies of information use have had on information goods. In this respect, these two technologies of information use create a problem for right holders. The problem is that as the technological circumstances of society have changed, the justification for exclusive ownership of information goods utilised on such new technology becomes questionable.

At this point in the paper, one can begin to establish what exactly the practice is trying to achieve. The practice is, first, an attempt to counter the economic effect of these two technologies of information use. It wants to do so because they constitute a problem in justifying the continued application of concepts of exclusive ownership and property rules to information goods distributed and supplied upon these media. Of course, right holders want to distribute and sell their wares in this media, but they also require the rights that offer them legal protection and exclusivity (and profit) while so doing. So, how does the practice do this? Simply, it first counters the economic effect of the technologies of information use, the subversion of the quantitative relationship, by *creating* a quantitative relationship between the availability of information goods on the digital and distributed communicative environment. This act explains the *first objective* of the practice; the exclusion of free access (free being meant both in the pecuniary sense and the liberty sense) to information goods that are digitised and stored, distributed and sold on the distributed communications network. Such exclusion of freedom creates a quantitative relationship between the availability of the information good and the want or need for the information good, one that did not previously exist. The presence of actual technological exclusion is not the only benefit of the quantitative relationship: as a result of its existence, and in order to effect distributive justice, exclusive ownership and property rules can be applied and appear justifiable, to the delight of copyright owners.

### 5.1. The second objective and the creation of value.

In order to explain the *second objective* of the practice, one must return to some more of the work of Menger, specifically some aspects of his discussion of the general concept of value. Menger begins this discussion by re-stating that if the want or need for a good is greater than the quantity of a good available, society is forced to economise. However, he departs from this standard analysis to additionally state, “their perception of this relationship gives rise to another phenomenon, the deeper understanding of which is of decisive importance for our science. I refer to the value of goods”<sup>22</sup>. It is this important act of *perceiving* the quantitative relationship, and the *effects* of the quantitative relationship, that give rise to the *creation* of value.

In the context of a quantitative relationship, between the want/need for a good and the availability of a good, certain needs will remain unsatisfied, and further

---

<sup>22</sup> cf. Menger (n 2 above), 114.

diminishment of the availability of the good will continue to cause subsequent needs, perhaps previously accounted for, to be “satisfied either not at all or only less completely than would have been the case”<sup>23</sup>. As such, Menger points out that satisfaction of the needs of society is “therefore dependant on the availability of each concrete, practically significant, quantity of all goods subject to this quantitative relationship”<sup>24</sup>. Importantly, Menger suggests, if society, in the process of economising, becomes aware of this state of circumstances - if they perceive that satisfaction is dependant on “their command of each portion of a quantity of goods or on each individual good subject to the above quantitative relationship”<sup>25</sup> - then goods attain value. What Menger is suggesting here is that if one understands the effect of something existing in a quantitative relationship, and one can command that understanding, one can create value. The perception of the existence of a quantitative relationship, and, more importantly, the perception of the necessary economising that results from such a relationship in order to satisfy either completely or partly the needs of society, can result in the creation of value for those goods. It does so because it ensures that those who so perceive become aware that the satisfaction of needs that are dependant on a good which is subject to a quantitative relationship are themselves dependent on the level of *availability* of that good. This is not merely an awareness of the requirement to economise because goods stand in a quantitative relationship between their availability and their requirement; it is an awareness of the importance goods attain *because* they require economising. Awareness of that importance, and command of it, creates value in goods. Thus, as Menger has written, “value...is the importance that individual goods or quantities of goods attain for us because we are conscious of being dependent on command of them for the satisfaction of our needs”<sup>26</sup>.

Admittedly, as Menger points out, value results from the same source that makes goods economic - the quantitative relationship. However, he distinguishes between the requirement for economising and the creation of value - economising results from an awareness of the disparity between availability and need when goods are subject to a quantitative relationship. Value, on the other hand, results from an awareness that the goods subject to a quantitative relationship have an *important significance* and that *command* of such goods is equally significant in satisfying our needs. In this way, “value is nothing inherent in goods, no property of them, but merely the importance we attribute to the satisfaction of our needs, that is, to our lives and well being, and in consequence carry over to economic goods as the exclusive causes of the satisfaction of our needs”<sup>27</sup>.

Menger suggests that this explains why only economic goods have value to society, whereas goods subject to quantitative relationships responsible for a non-economic character of a good (such as where the good is much greater than the need), and, implicitly, goods not subject to a quantitative relationship at all, cannot attain value. I would make two points here. First, I suggest that all tangible goods are subject to an *inherent* quantitative relationship irrespective of the particular specifics of a want/need and availability scenario; therefore they are all inherently capable of obtaining value. Second, in response to Mengers suggestion that such goods that are not capable of existing in quantitative relationship cannot obtain value, I disagree. If

---

<sup>23</sup> cf. Menger (n 2 above), 115.

<sup>24</sup> cf. Menger (n 2 above), 115.

<sup>25</sup> cf. Menger (n 2 above), 115.

<sup>26</sup> cf. Menger (n 2 above), 115.

<sup>27</sup> cf. Menger (n 2 above), 116.

goods that are not capable of existing in a quantitative relationship between their availability and their requirement are excluded from free access, a quantitative relationship *is* created and, subsequently, value can be obtained. In this way one can state that no good is actually not capable of existing in a quantitative relationship. Some goods may benefit from natural scarcity and rivalry, through natural physicality; others are capable of having scarcity and rivalry imposed upon them by human kind. All goods, therefore, are capable being restrained in their use. Admittedly, Menger does implicitly accept this state of affairs. He points out at a later stage that “the value of goods arises from their relationship to our needs, and is not inherent in the goods themselves. With changes in this relationship, value arises and disappears”<sup>28</sup>. Menger provides the example of the inhabitants of an oasis who have command of a spring that has abundant water to meet their requirements. In such a scenario, the water has not value in the sense described by Menger, although it does have a use value, or utility. However, if an event occurred that decreased the yield from the spring to a small amount, the water would then definitely have value in the sense that Menger describes, because the inhabitants of the oasis become aware not only that there is a quantitative relationship between the availability of water and their desire of water, but that the effect of such a relationship impinges on the satisfaction of their needs.

If, in the example above, the good of water was substituted by the good of information, interesting events occur. For information goods to be perceived in the same way as water when the oasis had a full and seemingly endless supply of water, having little or no exchange value amongst the inhabitants of the oasis, it needs to not exist in a quantitative relationship. Previous technologies of information use, however, imposed such a relationship on information goods, such goods appearing like the unyielding spring, and therefore becoming valuable. Changes in circumstance, however, change the ability of goods to have value. For example, the two new technologies of information use do not impose such a relationship on information goods, or at least, do not impose it to such a degree, thereby creating the appearance of information abundance. Information goods given shape by technologies of information use thus have utility, or use value, but no exchange value. However, this is not of benefit to right owners.

Their first action was, as has been described, to create a quantitative relationship by excluding free access. However, if they want to benefit from their quantitative relationship, they cannot simply exclude access. Aware of the important *effect* of the quantitative relationship, they must allow access, but *command* and *utilise* that awareness by continuing the quantitative relationship while allowing a certain use that ensures financial benefit. This principle explains the *second* objective of the practice; the control of use of information goods that are digitised and placed online subsequent to paid and/or permitted access. Achieving such an objective allows the necessary access that ensures reward, but maintains the created quantitative relationship, thus making use of the knowledge of the effect of relationship and creating value as a result of the quantitative relationship.

These two objectives, (a) the exclusion of free access to information goods that are digitised and stored, distributed and sold on the distributed communications network and (b) the control of use of information goods that are digitised and stored, distributed and sold on the distributed communications network, subsequent to paid and/or permitted access are the *regulatory objectives* of the practice, and are, I believe, generic to all substantiations of the practice of rights management in the digital and

---

<sup>28</sup> cf. Menger (n 2 above), 120.

distributed communicative environment, irrespective of the technology involved. While such objectives are the main focus of this paper, it is worth highlighting, for the sake of completeness, another set of objectives relevant to the practice. The actions of the exclusion of access and the control of use must take place in a very distinctive electronic and digital environment. In this respect, the practice also has certain *architectural* objectives. First, the practice must achieve, *technologically*, the exclusion of access to information goods that are digitised and stored, distributed and sold on the distributed communications network. Second, the practice must achieve, *technologically*, the control of use of information goods that are digitised and stored, distributed and sold on the distributed communications network, subsequent to paid and/or permitted access. These are the architectural objectives of the practice, also generic to any substantiation of the practice. The distinction may appear trite, but it is not; it is an important distinction between what is to be achieved (*the regulatory objectives*), and how it is achieved (*the architectural objectives*). Although this paper will focus on difficulties with what is to be achieved, there are also substantial problems with the nature of achievement which have been explored elsewhere.

What is initially useful about isolating these two sets of objectives, the regulatory and the architectural, is that they allow the creation of a considered and objective understanding of the practice in hand, rubbishing the ineffectual pithiness of such commonly used terminology as DRM and TCM. If one has to describe the practice in a succinct manner, at the very least the objectives allow one to state that the management practice is one concerned with the creation of techno-legal systems that manage informational goods in the digital and/or distributed communication environment, although even this comparatively lengthy description does no justice to the understanding of the practice that emerges in the process of determining the objectives. In fact, not only is the process an important aspect in understanding the objectives of the practice; it has an additional benefit in the context of this paper. The process of unearthing the objectives has required the additional exploration of certain economic theory. This exploration is not only useful in understanding the practice; through such understand it encourages useful criticism of the practice as a result of a clarified understanding. It is to such criticism that this paper now turns.

## 6. A critique of the practice.

Economic theory has assisted in determining the fundamental objectives of the practice. However, while it is useful to be able to clearly state what the practice wants to achieve (and also how it achieves it), the greater benefit that results from such a process of exploration is a greater understanding of the potential for criticism of the practice.

Utilising our exploration of economic theory in defining the objectives of the practice, one can begin by pointing out that particular technological circumstances of society have certainly changed and that this change has effected the economic character of information goods that are used in the new media. The change has subverted the existence of the historic quantitative relationship which, as has been discussed, acted, if not to justify the application of systems of management to informational goods, at least to rationalise it. Because of the importance such technological circumstances have in determining the economic character of information, and thus determining whether it exists in a quantitative relationship or not, such circumstances effect whether the application of systems of management – in other words the application of legal doctrine – are properly justified. If these circumstances are not properly accommodated or recognised then the use of such legal doctrine – such instruments of law – might be unjust.

It would appear that this is what is occurring with the use of doctrine in the practice. Exclusive ownership of informational goods that are placed within the digital and distributed communicative environment does not appear to be as strongly required as when such informational goods were utilised by historic technologies of information use. The economic phenomena that create a quantitative relationship between the amount of informational goods and the desire for informational goods no longer exist to the degree that they did with historic technologies of information use. Without the quantitative relationship, systems of management to ensure the distributive justice of the good are less required. However, the practice is applying such a system of management in order to create a quantitative relationship, control the effects of such a relationship, and thus protect vested interests.

The major difficulty with the practice is that the objectives, and the exercise of the objectives, are being justified as proper application of legal doctrinal concepts such as the exclusive ownership of goods and property rules that regulate such ownership, and, also, the freedom to, and of, contract with such rights. Such reliance on these doctrines is reflected in the regulatory objectives of the practice. The initial technological exclusion of free access to information is nothing more than a utilisation of, and reliance on, the conceptual protection offered by exclusive ownership and property rights in order to spite the economic character and resultant benefits of the digital and distributed communicative environment. The objective of controlling use subsequent to paid access is merely a reflection of the concept of freedom to, and of, contract. Although the purpose and justification for the use of the legal doctrine of the freedom to, and of, contract, has not been explored throughout this paper, this is not a major issue. The assessment of the ownership and property doctrinal aspects have been sufficient for the purposes of the paper. The main reason for this perspective is that contract can be viewed as a mere definition of an initial right created by the property rules that regulate exclusive ownership. In this light, a discussion of the creation and justification of the initial exclusive ownership can suffice in exploring problems with the practice. This is not to suggest that there are

no problems, either conceptually or practically, with the reliance by the practice on contract doctrine and any subsequent contractual definition of rights. Conceptually, one can point to the lack of just *causa*, created by the contractual definition of an inappropriate right. Practically, distinction between the regulatory and architectural objectives has allowed work on practical problems with contractual definition elsewhere, looking particularly at the technological specification of usage rights subsequent to paid access.

Such doctrines are being relied upon by the practice without any consideration, or proper accommodation, of the technological circumstances to which the practice is responding. It would appear that they are being utilised simply because they can be, and not, as has been the case historically, because they are required. Such an utilisation of doctrine is not sufficient. It would appear than far from being justified, the practice, its objectives, and its utilisation of legal doctrine, is unjustified. In fact, the utilisation of doctrine by the practice appears to support the suggestion that concepts such as exclusive ownership, property rules and contract, are self-justificationary i.e. that they can provide their own justification, without reference to external circumstance. In this way, the practice is an act of self-justificationary vested interest protection, and, in light of the proper utilisation of legal doctrine, unjustified. This suggestion has been supported by the utilisation of economic theory. However moral philosophy, particularly that of Hume, can also support the suggestion that the practice is unjustified.

## 7. The assistance of Hume.

The suggestion that the practice is potentially unjustified has been made with the support of economic theory. However, moral philosophy can provide additional support for the limits of any purely economic analysis of the merits or de-merits of the practice. Specifically, the work of Hume in his *Treatise of Human Nature*<sup>29</sup> offers a mirror to the perspective of Menger, essentially coming to the same conclusion by virtue of his moral philosophy. Such a moral argument offers undoubted support to the economic argument that suggests that the practice is unjust.

Assistance from the work of Hume emerges from his discussions on the origins of justice and property. Hume begins by stating that justice is an artificial virtue; that is, one which produces “pleasure and approbation by means of an artifice or contrivance, which arise from the circumstances and necessities of mankind”<sup>30</sup>. He then looks at two issues: first the manner in which the rules of justice are established by human artifice and second, the reasons that ensure society respect such rules.

In attempting to answer the former question, Hume follows a somewhat similar tack to that of Menger, isolating the disparity between the wants/needs of society, and the resources available to society to meet those needs. He begins by pointing out that nature appears to have exercised much cruelty towards humankind, providing them with needs/wants, and the things that can satisfy those wants, but ensuring that this relationship suffers from “numberless wants and necessities” and “slender means which she affords to the relieving these necessities”<sup>31</sup>.

The solution to this particular quantitative relationship, Hume suggests, is began by the formation of society. The formation of society, itself the result of the most fundamental want/need and available resource relationship that is sex between humankind, ensures the partial compensation of the infirmities imposed on humankind by nature. Such compensation can occur because the individual talents and skills of men and women are combined and strengthened in a society, augmenting the ability of humankind and allowing society to combat the “slender means” provided by nature for the satisfaction of wants and needs. As Hume writes, “Society provides a remedy for these three inconveniencies. By the conjunction of forces, our power is augmented: By the partition of employments, our ability increases: And by mutual succour we are less expos’d for fortune and accidents. ‘Tis by this additional force, ability, and security, that society becomes advantageous”<sup>32</sup>.

However, while the formation of society provides some respite against the problems that emerge from the quantitative relationship between wants/needs and resources (a point alluded to by Menger when he writes that society’s fundamental concern is the satisfaction of needs, an implicit suggestion that society will come together to provide initial respite in the face of the cruelty of nature), Hume is particularly aware that there are certain other particulars in the “natural temper” and “outward circumstances”<sup>33</sup> of humankind that are “incommodious” to the beneficial unity offered by society against the ravages of the quantitative relationship. For example, Hume points out that humankind is naturally selfish, and would usually love no other better than itself. More importantly, however, humankind is seen by

---

<sup>29</sup> Hume, D. *A Treatise of Human Nature*, (ed. Norton, D.F. & Norton M.J.), OUP, 2002.

<sup>30</sup> cf. Hume (n 29 above), 307.

<sup>31</sup> cf. Hume (n 29 above), 311.

<sup>32</sup> cf. Hume (n 29 above), 312.

<sup>33</sup> cf. Hume (n 29 above), 312-313.

Hume as being at the mercy of a “peculiarity in our outward circumstances”<sup>34</sup>. This peculiarity is evidenced in the nature of goods. For Hume, there are three different types of goods; “the internal satisfaction of the mind, the external advantages of our body, and the enjoyment of such possessions as we have acquir’d by our industry and good fortune”<sup>35</sup>. For Hume the first is “perfectly secure”. The second, he writes, may be “ravis’d from us, but can be of non advantage to him that deprives us of them”. The last type of good, however, is more complicated for Hume. While the improvements of such goods is undeniably the chief advantage of society, “the instability of their possession along with their scarcity is the chief impediment”, to the achievement of such an aim. The problem with the last type of good is that it is “both expos’d to the violence of others, and may be transferred with out suffering any loss or alteration; while at the same time there is not a sufficient quantity of them to supply every ones desires and necessities”<sup>36</sup>. This point is much the same as that made by Menger concerning the quantitative relationship between goods and needs, as it also highlights the defining aspect of that relationship, the scarcity of goods.

Uncultivated nature cannot provide a remedy to this problem, Hume suggests. The remedy results from artifice, or, as Hume puts it “nature provides a remedy in the judgement and understanding, for what is irregular and incommodious in the affections”<sup>37</sup>. If the problem with the third type of good described by Hume is its scarcity, it does not take long for society to appreciate that “they must seek for a remedy, by putting these goods, as far as possible, on the same footing with the fix’d and constant advantages of the mind and body”<sup>38</sup>. Simply, society realises that the principal problems in society arise from the scarce nature of goods. Hume is suggesting, as Menger has done, that goods exist in a quantitative relationship concerning their availability (or scarcity) and the desire for such goods. Like Menger, Hume realises that a system of managing such goods, so that they appear to be on the same footing with the ‘fix’d and constant advantages of the body and the mind’ is required. Since, as Hume suggests, “the principal disturbance in society arises from those goods, which we call external, and from their looseness and easy transition from one person to another”<sup>39</sup>, a system of management to ensure distributive justice is required. The remedy, Hume suggests, ‘can be done after no other manner, than by a convention enter’d into by all the members of the society to bestow stability on the possession of those external goods, and leave everyone in the peaceable enjoyment of what he may acquire by his fortune and industry’<sup>40</sup>. This is essentially the idea of exclusive ownership of goods, for as Hume suggests, the general observation becomes ‘it will be for my interest to leave another in the possession of his goods, provided he will act in the same manner with regard to me’<sup>41</sup>. This recognition of self-interest also acts to answer the second question of Hume in relation to justice – why does society respect rules of justice? In addition to exclusive ownership, Hume identifies the ideas of rules relating to such exclusive ownership; ideas of justice and injustice in the use and transfer of such exclusively owned objects, notions of property, rights and obligations.

---

<sup>34</sup> cf. Hume (n 29 above), 313.

<sup>35</sup> cf. Hume (n 29 above), 313.

<sup>36</sup> cf. Hume (n 29 above), 313.

<sup>37</sup> cf. Hume (n 29 above), 314.

<sup>38</sup> cf. Hume (n 29 above), 314.

<sup>39</sup> cf. Hume (n 29 above), 314.

<sup>40</sup> cf. Hume (n 29 above), 314.

<sup>41</sup> cf. Hume (n 29 above), 315.

Importantly, Hume asserts that the use of these instruments as instruments of justice emerges from the convention established by society to allow exclusive ownership, a convention that itself results from the aforementioned inconvenient circumstances. Those inconvenient circumstances are “the selfishness and limited generosity of the human mind” and the “easy change of external objects allied to their scarcity in comparison to the wants and desires of man”<sup>42</sup>. Without them, the need for justice, and thus, in the context of goods, the need for exclusive ownership and property rights, would not be in existence. This is a vitally important point. Hume is highlighting how important the ability of goods to exist in a quantitative relationship is in justifying the application of concepts of exclusive ownership of goods and subsequent property rules to such goods.

Rather more importantly, for the purposes of this paper, Hume also asserts that if these inconvenient circumstances changed, the justified use of the systems of management changes. As he states, ‘tis only from the selfishness and confin’d generosity of man, along with the scanty provision nature has made for his wants, that justice derives its origin<sup>43</sup>, referring to the justice embodied in exclusive ownership and property rules. In this respect, similarly to Menger, but from a moral perspective, Hume is asserting the quantitative relationship as central in justifying the application of such remedial instruments. More generally, (and perhaps more importantly), Hume is asserting the importance of external circumstances, of politics, in justifying the use of law. He is saying that law is not a self-justificatory construct.

The important point to be made, either by virtue of the work of Menger or Hume, is that, in respect of informational goods, certain inconvenient circumstances have changed. The inconvenient effect of historical technologies of information use on information, the creation of a quantitative relationship, has been affected. Digitisation and distributed communications do not have the same economic effect, providing the inconvenient circumstances which require justice in the form of exclusive ownership and property rules. In this fashion, one can point to both Menger and Hume as suggesting that the use of exclusive ownership and property rules, without the political circumstances that require such use, is unjustified. Arguably, this is what is occurring with the development and use of digital rights management systems.

---

<sup>42</sup> cf. Hume (n 29 above), 317.

<sup>43</sup> cf. Hume (n 29 above), 318.

WORK IN PROGRESS