

# Justice or Beneficence: What Regulatory Virtue for Nano-Governance?

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## Abstract

With nanotechnology we are not only moving into a new technological world but into 'a new legal, ethical, economic, social, cultural and political one too'. The article examines the questions of value preference in this transition to the new technological world and proposes to employ the moral concept of beneficence as a regulatory virtue for the governance of nanotechnology. Setting up the concept of beneficence against the concept of justice, the article argues that beneficence, instead of the relatively inferior virtue of justice, is the appropriate regulatory virtue for the governance of nanotechnology. It proposes the 'beneficent regulation of nanotechnology' which will be distinctive for its direct engagement with substantive and normative values as distinguished from previous proposals of regulation which were largely short on substantive values.

## Introduction

Once derided as science fantasy, nanotechnology is fast developing as the orthodoxy of contemporary technoscience. From a virtual non-existence two decades ago, nanotechnology has emerged as a discipline in its own right. It now boasts such appellations as 'über-science', 'mega-', 'super-' and 'proto-discipline'. (Fogelberg and Glimmel, 2003; Lopez, 2008, p.1266; Milburn, 2003, p.273) Some commentators predict that, sometime before 2030, most products of common use will become or comprise nanotechnology. (Kurzweil, 2003; Davies, 2008) For a technology that is being incorporated in consumer products with an increase of nearly 400% in just three years, such prediction could hardly seem unrealistic (Project on Emerging Nanotechnology, 2010). However, its development has not been readily apparent for all to see. The march of nanotechnology is rightly dubbed as 'a tsunami'- a metaphor that captures the stealth and transformative potential of the technology. (Berne, 2006, p.319; ETC Group, 2008, p. 11)

With nanotechnology we are not only moving into a new technological world but into 'a new legal, ethical, economic, social, cultural and political one too'. (Hunt and Mehta, 2006, p.9) The article examines the questions of value preference in this transition to the new technological world and proposes to employ the moral concept of beneficence as a regulatory virtue for the governance of nanotechnology. Setting up the concept of beneficence against the concept of justice, the article argues that beneficence, instead of the relatively inferior virtue of justice, is the appropriate regulatory virtue for the governance of nanotechnology. It proposes the 'beneficent regulation of nanotechnology' which will be distinctive for its direct engagement with substantive and normative values as distinguished from previous proposals of regulation which were largely short on substantive values. (Brownsword, 2008, p.36, Prosser, 2010, p.3)

'Beneficent regulation' draws attention to the 'benefit-management' side of the regulation of technology. As Neal Stephenson put it in his sci-fi novel imbued with prescience, the question of what to do with its benefits will be more preoccupying than the question of what nanotechnology can do. (Stephenson, 1995, p.31; Treder and Phoenix, 2007, p. 316; Wood et al, 2007, p.17) Cognizant of the fact that regulation of technology remains a lop-sided engagement with risk management, the regulation scholarship is taking on the issue of benefit regulation in 'the expanded concept of regulation' that seeks to highlight the values regulation will have to promote. (Prosser, 2010, p.4) Expanding on this development in the regulation scholarship, and drawing on the debate from the larger discourse on moral philosophy, it is argued here that the virtue of beneficence should be developed from being a staple of abstract moral philosophy into being a practical normative ingredient of the regulatory governance of nanotechnology.

# 1. Nanotechnology: from Quantum Metrology to Giga-ideology

Some have suggested defining nanotechnology only in terms of scale: 'Nanotechnology simply does not exist. What is real is science, technology and engineering at the nanometre scale.' (Loveridge, 2002) Such has been an enduring tendency in the US where a focus away from 'a categorical definition based on size alone' is recommended. (Maynard, 2011) The size in question is measured in nanometres. Nanometre is a unit in quantum metrology: the science of measurement at the size scale of atoms and molecules. (Royal Society and Royal Academy of Engineering, 2004. p.13; Wood et al, 2007, p.43) However, nanotechnology is now conventionally defined not only in terms of scale as science and technology operating at the scale range of 1-100 nm but also in terms of the exploitation of the novel properties of matter at this scale. (NNI, 2010)

While the novel properties of matter at the nanometre scale may have been a boon for nanotechnology promotion, what was genuinely driving nanotechnology initiatives right from the outset was the promise enshrined in the original conception of nanotechnology attributed to Feynman and Drexler. The Drexlerian concept of 'molecular nanotechnology' has secured overt and covert official imprimatur as can be gathered from the references to it in government reports and strategic plans of the leading countries. (Regis, 2004; Schummer, 2006, p.219; Uskokovic, 2007; p.44) 'Shaping the World Atom by Atom' is a slogan of the US National Nanotechnology Initiative (NNI). Commenting on the arrogation of the slogan by the NNI, Nordmann needed to remind us that it was not Drexler who uttered these words although the idea is unmistakably attributable to him. (Nordmann, 2010, p.42) While this conception of nanotechnology had a deep impact on the big nanotech initiatives, its influence appears to have been short-lived as it was replaced subversively by the conventional conception of nanotechnology defined by the criteria mentioned above. Despite its enormous contribution to nanotechnology policy and law, Drexler's vision of 'molecular manufacturing' has been summarily set aside for science fiction writers and futurist speculators. Hence, the bemoaning by Storr Hall, President of Drexler's Foresight Institute:

'The bottom line is that 20 years on, the world has picked up strongly on one of the main legs of the nanotech vision, working at atomic scale and precision. The other one, autogenous systems, has been sorely neglected.' (Hall, 2009)

In the Drexlerian conception of nanotechnology, emphasis is laid more on what nanotechnology can achieve than what it is. In this approach, broader goals are included as indispensable elements of the definition which assumes more the form of a vision than a descriptive formulation as spelled out by Drexler:

'molecular nanotechnology [which Drexler considers as the appropriate and precise expression for the technology] ... does not merely refer to the fabrication of nanometre scale structures, but rather to a set of capabilities that will give thorough, inexpensive control of the structure of matter based on molecule-by-molecule control of products and by-products of molecular manufacturing.' (Drexler, 1992, p.7)

It is not so much the length scale or the novel properties of matter that interest nanotechnology players or society at large. The obvious reason behind the premature hype, the intense interest of industry, the desire of governments to control it and the fierce competition to avoid the danger of missing the boat, in short, what turned it into a 'giga-ideology', is the transformative potential of nanotechnology. (Munshi et al, 2006) Nanotechnology will lead to the 'Molecular Epoch' where a complete or near complete mastery over matter will be achieved. (See the discussion in Wood et al, 2003, p.26) Nanotechnology with other technologies marks the transition from the Age of Discovery to the Age of Mastery whereby humans graduate into the 'active choreographers of Nature' (Kaku, 1998, p.5) proffering 'the potential for dramatic social change.' (Wood et al, 2003, p.26)

As Nordmann points out, it is this kind of conception of nanotechnology, that is 'yet to come', which is commonly understood as 'the 'real' nanotechnology and the nanotechnology that calls for regulation'. (Nordmann, 2010, p.32) Such definition endorses the viewpoint that nanotechnology is 'a socio-economic process that seamlessly integrates a series of specific activities.' (Nicolau, 2004, p.448) This article subscribes to the advice Wood et al put forward: 'Rather than seeing the issue of the field as a matter of definition or at least as defining it once and for all, it may be more helpful to approach it as a sociological issue.' (Wood et al, 2007, p.12) Hence, nanotechnology is understood here loosely as 'an umbrella term' for the scientific and technological activities where the conditions in the conventional definition and/or the features in the molecular manufacturing notion prevail.

Accordingly, from the regulatory point of view, it is preferred to risk an over-inclusion with such broad understanding than risking under-inclusion and fragmentation. (Wood et al, 2003, pp.26, 29) Thus, no distinction is made here between nanotechnology as material, process, device or system; nor between 'generations' or 'classes' of nanotechnology. (Lin, 2007, p.354) In a similar context, Maynard (2011) warns of the deleterious effect of a 'black and white definition' impairing effective regulation. The adoption of a dynamic broad open-ended definition is crucial from developing countries perspectives. Such a definition helps to avoid the risk of fragmentation or under-inclusion of certain areas that may be of importance to these countries. (Niosi and Reid, 2007, p.436; McHale, 2009, p.71)

Whereas the citizens of all countries do have a compelling interest in shaping the development of nanotechnology in terms of both risk and benefit management, no mechanism is in place to deliberate on its global impact and to accommodate the concerns and interests of all nations. We have yet to see steps taken in the trails of the World Summit on Information Society (WSIS) however rudimentary those steps may be. The accommodation of the interests of developing countries is dependent on the kind of definition that will be adopted. Wood et al (2003, p.25) could not have overstressed 'the correlation between the perception of nanotechnology and its potential impact.' This correlation could explain the rapid nanotechnology growth in luxury items - cosmetics, sports and fitness equipment and entertainment appliances as opposed to the woefully slow progress in nanotechnology products relevant for the poor like water filters, life-saving medicines, food production and other necessities that have long ceased to be of concern in developed countries.

## 2. Regulating the risks as well as the benefits of nanotechnology

The regulation of nanotechnology almost invariably refers to the regulation of potential risks arising from the deployment of nanotechnology. Rarely is mention made of the 'regulation of benefits'. Regulation in general and the regulation of modern technologies in particular remains a risk management specialisation least concerned with the distribution of benefits. Risk regulation does not aim at answering the question as to how the benefits are to be disbursed once risk analysis issues are somehow settled. As Brownsword and Somsen (2009, p.38) have pointed out '[i]f there is no potential for harm - if nanotechnology could not hurt a fly, let alone a human - there is no cause for regulatory concern.' This viewpoint finds support from the 'risk colonisation' thesis that Rothstein et al (2006) discussed in the wider context of regulation.

Currently, the regulation of benefits is left to the jurisdiction of the market and if there is any regulation of benefits, it is entertained for purposes of correcting market-failure. Whether the benefits of nanotechnology should be left to the market is an issue that would be dominating the debate on the governance of nanotechnology. (Ludlow, 2007, p.169) The 'benefit management' agenda or 'regulating for positives' (Brownsword and Somsen, 2009, p.49) now commands higher priority. Hunt (2008, p. 277) stresses the need to move beyond the 'risk management' approach to a wider 'benefits management' function of identifying and negotiating global priorities'.

In dealing with benefit management issues, the trend has been treating these issues under the rubric of 'risk regulation'. Regulators and the regulation scholarship are constantly shifting the goalposts of risk regulation mainly through the analysis of the evolution of an ever-widening concept of risk aptly captured as 'risk colonisation'. (Rothstein et al, 2006, p.93) Risk has become 'an organising concept as never before.' (Power, 2004, p.13) While the recognition of benefit management issues as issues of risk management is a salutary step as far as the debate on the distribution of benefits is concerned, there are obvious difficulties in subsuming benefit regulation under risk regulation. The ongoing shift towards 'risk regulation' is not a corrective development with regard to benefit management as the focus is still on risk despite the attempt to accommodate benefit management within risk management. As Fisher (2010, p.54) points out, '[t]he re-casting of regulatory activities in terms of risk' is of crucial significance as 'the goal of regulators is now more specifically defined than in the past.' Hence, Fisher (2010, p.54) illustrates, an environmental protection regulator is now required to narrow down environmental protection to issues of environmental and health risks as opposed to a broad mission to protect the environment. Black and Baldwin (2010, p. 199) concur with Fisher: 'Risk-based regulation starts with identifying risks to be managed, not rules to be complied with.' With benefit-focal regulation, it is easier to follow the issues in a much more straightforward manner where risk management is not intermeshed and confused with issues of benefit management.

That does not mean, however, that one can be dismissive of the mutual effects of risk regulation on benefit regulation or vice versa. Fashioning a distinct jurisdiction of benefit regulation would help streamline the mutual effects between benefit regulation and risk regulation without one discourse obviating the other. Failure to put in place such a distinct jurisdiction with the move to accommodate social and ethical issues within risk regulation will confine the issues to a highly circumscribed space creating 'a serious gap in the regulation of nanotechnology'. (Lee, 2010, p.817) There is a veritable fear that the risk issue may 'paralyse decision-making' on issues including the fostering of the technology as well as the fair distribution of its benefits. (Id, p.804) It is highlighted that '[r]egulatory failure to interrogate the nature of the spread of benefits from a technology silences competing ideas of progress, even complementary ideas of progress.' (Lee, 2009, p.285) Reserving an appropriate jurisdiction for benefit regulation with an exclusive focus on benefits will help defuse the anxiety emanating from the challenge of preventing the discourse on benefits from being hijacked by the risk discourse.

Fortunately, we do not need to start with a clean slate to erect such a jurisdiction as previous and current governance regimes offer us valuable precedents. The regulation of benefits is gathering pace in the regulation of financial markets despite the setbacks and lapses it has yet to overcome. The financial transaction tax scheme, alias Robin Hood/Tobin Tax, spearheaded in the Euro zone provides an instructive anecdote. (Treanor, 2011, p.26) Earlier, on the occasion of the launch of the World Summit on Information Society (WSIS), Kofi Annan was quick and forthright in pointing out that the Summit was 'unique' because the focus is on benefits for the first time and not on risk as it used to be the case with

previous international conferences with a technology governance theme. (Souter, 2007) This is equally true of nanotechnology albeit couched in the language of risk: as Dupuy (2008, p.238) emphasises, 'the foremost risk for any country today' piling all other risks is indeed the eventuality of falling behind in the competition in harnessing nanotechnology's benefits.

### 3. Regulating Nanotechnology - only a matter of justice?

One of the concepts that is receiving increased attention in the current debate on nanotechnology is the concept of justice. There is a remarkable surge in the literature at the interface of nanotechnology and justice. It is rightly concluded that 'the ethical profile of the 'justice principle' in the potential benefits is certainly strongly felt in the international discussion on the issue of 'nanotechnologies'....' (National Bioethics Committee, 2006) Recent literature includes the 2009 issue of the journal *Nanoethics* featuring articles from a thematic symposium on justice and the 2011 Nanotechnology in Society Yearbook. (Nissen, 2009, p. 119 and Cozzens and Wetmore, 2011, p. XIV) The allocation of benefits in general has been an issue examined under the theory of justice - more precisely, 'distributive justice'.

However, it is time to ask whether the prerequisite circumstances of justice obtain when nanotechnology takes over the global economy. It would be odd if questions as to the validity of the idea of justice for the purposes of the regulation of nanotechnology are not raised with the change in circumstances. As the following quote points out, such interrogation has begun with scepticism about extant conceptions of justice and with an appeal for a more radical overhauling of the same.

'...the social and ethical challenges associated with nanotechnology cannot be adequately understood by considering nanotechnologies in themselves or by considering them within the context of an idealized or theoretical society that meets appropriate standards of justice.' (Sandler, 2007, p.451)

Such interrogation is, however, short of suggesting the idea of overriding or discarding the concept in cases where it might become a drawback to the governance of the technology.

In the general philosophical discourse, justice has been diagnosed for such serious limits that the need to supplement it with other virtues has become apparent. (Heller, 1987; Sandel, 1998 and MacIntyre, 1985) While O'Neill (1998, p.194) insistently underscores that 'justice is not enough', Fraser (2009, p.17) observes the dominant theories of justice are chronically deficient to 'provide an adequate understanding of justice for the capitalist society.' With nanotechnology and other technologies changing its determinant circumstances, justice, as the underlying virtue of regulatory governance, has certainly come under elaborate scrutiny. Closer attention needs to be paid to both the enabling and ennobling aspects of nanotechnology, viz., the technological change leading to prosperity and the concomitant moral progress.

The dissatisfaction with the idea of justice in some contexts has triggered a shift of focus towards the principle of beneficence. This shift was particularly pronounced in the context of biomedical ethics especially in the US. (Buchanan, 2009, p.71) A recent report by the Presidential Commission for the Study of Bioethical Issues (Presidential Commission, 2010) has called for a principle of 'public beneficence' for the governance of emerging technologies including nanotechnology. 'Beneficence' is among the moral concepts that the European Commission (2004) proposed to enforce through regulation of nanotechnology. The aim here is to amplify this trend towards reconceptualising the virtue of justice for purposes of the regulation of nanotechnology in what I will call here 'beneficent regulation'. The main purpose of the discussion is, however, the instatement of beneficence (or, interchangeably, benevolence) as the regulatory virtue for the governance of nanotechnology and, hence, the idea of engaging with the virtue of justice comes only as a secondary consideration.

#### 3.1 Critiquing justice as the ideal for nano-regulation

Over the millennia to me after to me has been and is being written on the theories of justice. It will be an utterly preposterous claim if one sets out on discussing the myriad theories in any one volume in any way that does justice to each theory. Certainly no such claim is to be made here. A discussion of the most general conclusions about the theories and the commonalities among them suffices for our purpose. The 'radical heterogeneity of justice discourse', as Fraser (2009, p.2) puts it, has kept the concept eternally elusive. There are conflicting theories about the meaning of justice and as yet no one has come with an 'algorithm that could resolve such disputes'. (Miller, 1999, p.220) The ambiguity is further aggravated by the charge that what may be taken as the 'ordinary thinking' about justice is fraught with 'deviant uses' of the concept. (Miller, 1976, p. 122) Even the supremely influential Rawlsian theory is described as one that 'departs from ordinary notions of justice'. (Miller, 1974, p.388) It is no wonder then that whatever is said to be represented by the concept of beneficence may well have been treated in the mantle of justice.

Among commentators pleading justice as a regulatory virtue for nanotechnology, references to Rawlsian theory are by far the commonest. (Allhoff et al, 2010, pp. 129-32; Ebbesen et al, 2006, p.460) However, just like their colleagues in the

general philosophical discourse, these commentators often use the concept with a touch of double entendre uncoupling and re-coupling justice and beneficence. Rawls himself is accused of smuggling charity or beneficence in his theory of justice. (Buchanan, 1982b, p.46) Augustine defines justice in terms of charity simply positing that '[j]ustice consists in helping the wretched'. (Miller, 1976, p. 285) Contextualised to the nanoethics debate, this same idea is relayed: '[j]ustice and the care of the poor should not be ignored.' (O'Mathúna, 2009, p.91) Aware of the charity pull in the thinking on distributive justice, Allhoff et al (2010, p.149) left unanswered the question about the proper concerns of justice. In biomedical ethics, it is concluded that many proposed principles of justice are 'not distinct from and independent of other principles, such as nonmaleficence and beneficence'. (Beauchamp and Childress, 2009, p.240)

The distinction between 'social justice' and beneficence, charity or humanity is regarded as nothing but a distinction without a difference. (Buchanan, 1987, p. 575; Stanford Encyclopedia of Philosophy) The postmodernist reconstruction of justice, recasts justice as the 'ethics of alterity' where 'the ethical relationship constitutes the Other as the face and myself as the moral agent with an unconditional responsibility towards the face'. (Hudson, 2003, p.195) For other schools of thought, such a reference to the Other has its place in beneficence, humanitarianism, or charity. (Jones, 1999, p.13; Miller, 1976, p.124) The blurring of the line between justice and concepts like humanitarianism, charity, and beneficence is characteristic of the discourse on global justice. This development is welcome by some thinkers. Buchanan goads us not to regret the absence of this distinction as nothing important is lost by such absence. (Buchanan, 1987, p.574)

Despite the deep disagreement over the primacy of any one particular conception, there seems to be a baseline presupposition that all conceptions of justice require - their underlying assumption of the scarcity of resources. (Jones, 1999, p. 4) Whether justice with its presupposition of scarcity is the proper ideal for the regulation of nanotechnology will have to be decided taking into account the potential of nanotechnology to bring an end to material scarcity. Following Hume, Rawls (1999d, p.234) pegged justice to a stage of technological development where 'the state of technology' does not allow us to go beyond justice. While humanity is on course to end material scarcity with the help of nanotechnology, it would not be a sufficient condition to go beyond justice. Hume's other requirement - 'the benevolence of men' has yet to be secured to go beyond justice. In a utopia of unprecedented material abundance, the concept of justice has to be either recast or totally dispensed with as per Hume's theory which Rawls thoroughly endorsed:

'Encrease [sic] to a sufficient degree the benevolence of men, or the bounty of nature, and you render justice useless, by supplying its place with much nobler virtues and more favourable blessings.' (Sandel, 1998, p.32)

The following quote may be taken as a version of Hume's theory in the nanotechnology context:

'If the most radical futuristic visions prove possible, and if we allowed them to be realised, then new ethical issues might certainly arise. Societal transformation would be absolutely radical if each household had its own Drexlerian manufacturing kit, with self-replicating nanobots turning carbon and sunlight into whatever matter was needed, including food. Such abundance would render current theories of justice irrelevant, since they all assume a scarcity of resources.' (Litton, 2007, p. 24)

There are indeed compelling reasons to examine the theories of justice to verify their relevance for the regulation of nanotechnology. We should also proceed to the identification of appropriate values that such regulation should enforce. Accordingly this article draws attention to the ethical category of beneficence and away from the much rehearsed appeals for justice. However, the materiality of nanotechnology's claim to lead to material abundance upsetting the relevance of justice is not a given and has to be examined before justice is required to retire.

### **3.2 Scarcity and Justice: Engaging with Nano-utopia**

A positive utopian outcome of the nanotechnology revolution is an underlying assumption for the arguments here. Not everybody agrees on the truism in the US National Nanotechnology Initiative (NNI) motto: 'Leading towards the Next Industrial Revolution'. Commentators are not at ease when appreciating the (r)evolutionary nature of nanotechnology. Consider, for example, this vacillating statement: '...although surely implying a revolution as far as matter-processing is concerned, it is not entirely revolutionary.' (Fogelberg and Glimmel, 2003, p.7) The charge is rightly lodged that the commentators are trying 'to have it both ways' describing nanotechnology as both revolutionary and evolutionary. (Shelly-Egan, 2010, p.185) It is to be noted, however, that those who hold it to be evolutionary rather than revolutionary do so with such qualification that brings their assessment close to the appreciation of those who hold it as revolutionary. Wood et al (2007, p.10), for example, argue that 'the products of incremental and evolutionary nanotechnology will themselves have profound and potentially revolutionary impacts.' (See also, Loveridge et al, 2008, p.41)

Notwithstanding the debate on whether nanotechnology is revolutionary or not, there are irrefutable precedents from previous technological revolutions to support the above assumption. Moreover, it appears that the room is shrinking for thinking about the progress of technology otherwise than in a largely deterministic way. The debate on technological determinism is a longstanding one and is constantly refreshed. As one commentator observed, '[i]t has taken major intellectual effort to discredit the seductive notions of autonomous technology and technological determinism'. (McGinn, 2010) This effort does not appear to have been successful and with nanotechnology 'technological determinism' appears as resilient as ever. As Drexler has succinctly put it, the idea is simple:

'Computers will become faster, materials will be stronger, medicine will cure more diseases. Nanotechnology, which works on the nanometre scale of atoms and molecules, will be a large part of this future, enabling great improvements in all these technologies.' (in Bostrom, 2007, p.134)

Some argue that 'raw technological determinism' is what is driving technological progress (Ceruzzi, 2005, p. 593), and it is even more pronounced with nanotechnology: trying to control nanotechnology is 'much like standing before a tsunami and yelling 'No, go the other way.' (Berne, 2006, p.319) In an update to his (in)famous *Wired* article, Bill Joy (2010) recites technological determinism but hopes for a steering of technology which may be possible with brand new thinking: 'We can't pick the future, but we can steer the future....' Joy's musing seems to be a reflection on what is called the Control Dilemma that postulates the point that 'attempting to control technology is difficult and rarely impossible'. (Collingridge, 1980, p.19) Yet, the most that can be said about technology in general and, the 'inevitably coming, still-able-to-be-influenced, nano-future' (Mody, 2004) in particular, is what Charles Taylor has said: '[w]e are not indeed locked in. But there is a slope, an incline in things that is all too easy to slide down.' (in Spinello, 2006, p.9)

With nanotechnology, it is not only the determinism but also the imminence that needs to be addressed. Those who toss the nano-utopia into the distant future would also prefer to reschedule the ethics and regulation of nanotechnology until such time that the technology is fully or substantially realised. (Nordmann, 2007) As Baxi (2008, p.237) observes this kind of reaction to the technological surge is a sign of falling prey to a rather imprudent engagement with the breathtaking rate of technological development. What is more, the failure to appreciate the rapid advance of the technology and its consequences is prone to interpretation that no engagement may be necessary as the markets will sort it out as usual. (Beck, 2005, p.134) The possible scenarios warrant an early debate despite the remote appearance of the technological disruptions. (Allhoff and Lin, 2008)

A scenario of material abundance is more plausible in its nanotechnology context than in the context of all other technologies. Material abundance in the sense of having more of everything is unsustainable and hence undesirable. But that is so because the measure of abundance is perceived in familiar human scales conforming to the Protagorean principle that man is the measure of all things. With the promise of nanotechnology to make artefacts at the nanoscale approaching its realisation, material abundance is possible, sustainable, and desirable. (Nordmann, 2004, p.53)

It is the much sought-after 'dematerialised' economic growth that is afoot with nanotechnology. (Carley and Spapens, 1998, p. 111) As information technology has made the corporeal book a dematerialised and infinitely ubiquitous product, so will nanotechnology make everything profusely available. With the props provided by information technology, practical nanotechnology applications - the green shoots of a post-scarcity economy - are already over-ground. Nanotechnology is poised to enable humanity achieve the end of scarcity - 'an idea political systems have failed to fulfil'. (Koepsell, 2009, p. 166)

### 3.3 Justice and the current state of scarcity

One need not be put off by the seemingly futuristic post-scarcity society of the nano-age to inquire into the limits of justice. The conventionally held view that we are living in an 'age of permanent scarcity' is challenged by those who argue that we are living in an era of 'forced artificial scarcity' and those calling for the need to 'take the scare out of scarcity'. (Wong, 2010; Mehta, 2010) A simple juxtaposition of the riches of the few and the needs of the majority reveals that humanity is indeed wading amidst plenty. Such juxtaposition is, however, deceptive and encourages us to stay within the confines of the justice discourse where comparison of variables such as deserts, needs and rights is *themodus operandi*. It gives a sense of comparability of the poverty that afflicts the vast majority to the prosperity in which the few are immersed.

The comparative methodology at the heart of the concept of justice is another common element of most, if not all, theories of justice. Competing claims have to be compared in order to reach a decision as to who gets what as a matter of justice. Conceptions of justice are sometimes broadly classified as 'comparative' and 'non-comparative' depending on whether the conception involves comparison. (Buchanan and Mathieu, 1986) Conceptions of justice often require comparison and 'distributive justice' in particular necessarily falls under the category of 'comparative justice'. The main problematic of 'comparative justice' in the context of global poverty is its flawed assumption that extreme conditions of the poor and the rich are comparable. The risk of sliding down to relativism is especially highlighted in the context of nanoethics and the concept of justice does little to reduce this risk. (O'Mathúna, 2009, p.34) The comparative methodology of justice conceals the extremities relativising what are otherwise absolute conditions.

The rampant poverty across the globe is rightly qualified as 'absolute'. 'Absolute poverty', under which a billion people live, is defined as 'a condition of life so limited by malnutrition, illiteracy, disease, squalid surroundings, high infant mortality, and low life expectancy as to be beneath any reasonable definition of human decency.' (Sterba, 2005, p. 159) Any comparison involving these absolute conditions amounts to admitting that this level of poverty is acceptable in fairness to those who live in material superfluity. The facts of absolute poverty foreclose the application of the idea of comparative justice. (Heller, 1987, p.181) As Nagel reckons '[t]he facts are so grim that justice may be a side issue'. (2005, p. 118) The brimming abundance and the poverty alongside it are far too stark to be the subject of justice. Pogge's

(2008) observation of the gross mismatch in using comparative justice to tackle absolute poverty endorses this view: 'the problem of world poverty is both amazingly small [in economic terms] and amazingly large [in human terms]'.

Using a similar comparison, the UN Millennium Development Goals (MDGs) to eradicate extreme poverty by 2015 are said to be 'indecently, shockingly modest.' (Singer, 2006) It was also observed that, on the flipside of the current financial crisis, the goals are 'utterly achievable' as this is irrefutably adduced by the availability of resources for bailing out the banks. (BBC, 2009) These facts did not, however, result in acceptable reactions even as they were recited over several decades. Far from being useful in addressing absolute poverty, the idea of justice, particularly with the comparative methodology it employs, may have significantly hindered the development of principles more amenable to the predicaments of the vast majority.

At any rate, until humanity achieves the end of scarcity in all its forms, it appears justice would continue as an indispensable concept called upon to address issues arising from the deployment of technology. For the idea of justice to serve this purpose as the interim ethic, it will have to be reinforced by the superior ethic of beneficence. Yet, the idea of justice remains insufficient to capture the entire spectrum of the opportunities that the nano-future will offer. As Hume stressed, the end of scarcity by itself does not make justice redundant. While the bounty of nature can be expanded by deploying nanotechnology, the 'benevolence of men' has yet to be cultivated. The 'beneficent regulation' proposition here is an exercise in this direction.

## **4. Beneficence: the virtue for nano-regulation**

Justice is a 'poor virtue' as the ideal would have been 'a state where the need for justice was absent.' (Wolgast, 1990, p.349; Sandel, 1998, p.35) Echoing Hume, Sandel (1998, p.32) characterises justice as 'a remedial virtue, whose moral advantage consists in the repair it works on fallen conditions'. Rawls has his reservations about his own conception of justice where he cautions that '[j]ustice is not to be confused with an all-inclusive vision of a good society; it is only one part of any such conception.' (Rawls, 1999a, p. 48) Marx disparaged distributive justice qua fairness as 'obsolete verbal rubbish' only serving as the 'conclusive evidence of defects in the productive processes that form a society's core.' (in Buchanan, 1982a, p.59) Some even go as far as calling justice as 'the lowest of social claims'. (Dimova-Cookson, 2011, p.47) On the other hand, the virtue of beneficence is lauded as a superior cardinal virtue. (Frankena, 1987, p.6) For Hume, beneficence is the central principle of moral theory; for John Stuart Mill the principle of beneficence is 'the one and only supreme principle of ethics'. (Stanford Encyclopedia of Philosophy) O'Neill (1986, p.142) argues that beneficence is not only the first 'but 'the whole of virtue - a comment that is not extended to justice.' (Sandel, 1998, p.15)

However, despite these lofty credentials, beneficence and the theory thereof is not a well-developed concept. It is not yet settled whether charity is broader than beneficence or vice versa. While O'Neill (1989, p.233) considers charity as being less than beneficence, Livnat (2004, p.316) takes charity as inclusive of beneficence. Whether the beneficence discourse is indistinguishable from the discourse on social justice is still an open issue. (Stanford Encyclopedia of Philosophy) The debate on the mandatory nature of the duty of beneficence is not yet resolved. The inchoate nature of the concept of beneficence becomes even more evident when seen in comparison with extant theories of justice.

The sophisticated theories of justice lend a valuable template to construct a theory of beneficence. What amounts to a flagrant usurpation of the theories of justice for the purposes of formulating a theory of beneficence is Sandel's proposition on supplanting justice with beneficence in Rawls's theory of justice. Sandel (1998, p.45) inquires whether there is anything that prevents us from using Rawls's 'veil of ignorance' to arrive at beneficence instead of justice. Similarly, O'Neill (1989, p.230) reiterates that obligations of beneficence are arrived at in the same way as obligations of justice.

There are, however, some identifiable differences. Unlike the 'punctilious' justice, benevolence is a simpler and 'a much less sophisticated concept'. (Baier, 2010, p.ix; Livnat, 2003, p.507) It refers to doing good to others or, as Frankena verbalises it, 'do-gooding'. (1987, p. 14) Benevolence is referred to as 'the study of the good of others' and is distinguished from justice due to its exclusive focus on 'others'. (Frankena, 1987, p.5; Livnat, 2003, p. 507) Unlike benevolence, justice is about 'all' and includes the self when comparing rights, deserts or needs. In the Humean conception of justice - 'the cautious jealous justice', the self is critical as justice rests on 'the sure foundation of self-love'. (Miller, 1976, p.162). Benevolence, on the other hand, is 'by its nature, an unbalanced virtue'. (Livnat, 2003, p.513) It excludes the self not only because it tends to disregard the self by demanding a selfless act to benefit others, viz., sacrifice, but also because benevolence to oneself is captured by another notion - that of 'moral perfection' according to Kant. (Frankena, 1987, p. 5; Livnat, 2003, p. 508) There is a pronounced overlap between the notion of benevolence and the postmodernist reconstruction of justice where the Other is accorded priority - a move identified as 'the most dramatic reversal of principles in modern ethics'. (Hudson, p.195)

This reversal is also characteristic of Rawlsian theory too. In his Difference Principle, Rawls exclusively refers to 'the least advantaged' - an equivalent category to the 'Other'. Whereas Rawls refers to 'everyone's advantage' in the Difference Principle, he later clarifies the ambiguous breadth of the term by targeting 'the least advantaged' as the critical representatives in the phrase 'everyone's advantage'. 'All differences in wealth and income, all social and economic inequalities, should work for the good of the least favoured.' (Rawls, 1999c. p.163)

Rawlsian usage of the word 'everyone' in the Difference Principle warns us not to take the word at its face value. (Rawls, 1999c, p. 163) Likewise, in the nanoethics discourse, the focal thrust of the ethical dimensions of nanotechnology is squarely on how the technology benefits, 'the human potential of everyone'. (Cameron, 2006, p.284) The reference to 'everyone' here is, in effect, congruent with its Rawlsian usage. One cannot speak of the benefits of the technology to those who develop it without stating the obvious. The moot issue is whether the technology and its applications will benefit everyone and 'not simply those who develop them'. (Cameron, 2006, p. 284) As Cameron's (id) qualification makes it clear, everyone stands for the Rawlsian 'worst-off' category.

'Beneficence' is hardly a term that can do without an expanded description. It is denominated in the categories of care and concern that an agent extends to the sufferings and misfortunes of others, and the promoting of their well-being and welfare. (Livnat, 2004, p.304) Beneficence in the Kantian tradition is broader than charity or humanity in that it enjoins meeting ends even beyond 'agency-threatening needs' or just basic well-being as beneficence according to Kant 'consists in making another's well-being and happiness my end.' (O'Neill, 1989, pp.233, 115) It is not only 'another's wellbeing' but also another's 'happiness' that is the object here. While charity or humanity-based actions are certainly beneficent actions as they essentially relate to another's wellbeing, not all beneficent actions - such as those aimed at making someone happy or even happier - are based on humanity or charity. (Barry, 1997, p.525) This distinction is even more salient in view of the organic connection between poverty and inequality and the re-conceptualisation of poverty in terms of inequality without agency-threatening conditions. (Barry, 2005, p.323) It is in this broader sense that beneficence is to serve as the ideal virtue for the regulation of nanotechnology termed here as 'beneficent regulation'.

In biomedical ethics, beneficence is often held to be in tension with autonomy and in the nanoethics context, this tension is likely to resurface prominently as experts continue prescribing nanotech solutions to social problems in a paternalistic manner. (Beauchamp and Childress, 2009, pp.206ff; Invernizzi and Foladori, 2005, p.300) Kantian analysis of the concept of beneficence addresses this issue by employing the concept of 'ends' and aims at guarding against unwarranted paternalism by specifying 'others' as those 'who are at least partly agents and who have their own ends.' (O'Neill, 1989, p.116) The duty of beneficence is likewise defined as 'a duty to promote and share others' ends without taking them over'. (Id) The anti-paternalistic nature of beneficence needs to be emphasised since the revulsion toward charity by recipients is engendered by the unequal relation that charity ordains by endowing the benefactor with the discretion on whether to take action or not and to choose what kind of action to take. (Drumbl, 2002, p.897; Buchanan, 2009, p.33) The argument to supplant beneficence with justice and to demote beneficence to a category devoid of obligations as captured in the 'justice not charity' caricature, is instigated partly from the failure to take into account the 'ends' component of beneficence in the Kantian interpretation.

As implied in the slogan 'justice not charity', and in comparison with whatever duties benevolence is said to give rise to, the duties arising from the requirements of justice appear to be more fortified and straightforward than the duties arising from the requirements of benevolence. The slogan 'justice not charity' was launched with the aim of harnessing the potency of the concept of justice in allocating duties and as a reaction to the understanding of charity as an optional discretionary act devoid of obligations. The aversion to charity also finds expression in the nanotechnology context where putting an end to the 'dependency on ongoing technological charity' by foreign nations and firms is advised. (Miller and Scrinis, 2010, p.120)

The 'justice not charity' slogan was met with criticism due to its conflation of the duty arising from justice and charity respectively. (Dower, 1997, p.274) It does not attach any significance to the mutual imbrications of justice and charity. With respect to poverty alleviation, the existence of the duty to come to the aid of others seems to have attained the status of 'an unquestioned consensus' and even there is a claim that the duty will have attained the status of customary international law in the context of the MDGs. (Riddell, 1987, p.6; Riddell, 2007, p.150) It is the recognition of the duty of beneficence and not a discretionary consideration that underwrites development assistance. Most of the scepticism on the duty of beneficence in this regard is on the effectiveness of the execution of the duty rather than the existence of the duty. Despite the appearance of a settled issue in the global poverty context, the nature of the duty of beneficence will continue to dominate the debate - a debate that will be informed by the development of beneficial technologies.

## **5. A Peek at 'Beneficent Regulation'**

The principle of beneficence, understood here as benefitting others in a non-reciprocal and non-market based allocation of benefits, is one of the ethical values that the regulation of nanotechnology is expected to enforce. (European Commission, 2004, para. 3.5.1, Presidential Commission, 2010) This is a far cry from risk management and market-failure management that are currently the principal objectives of regulation with unchallenged dominance. However, as Prosser (2006, p. 376) maintains, objectives other than the objective of correcting market-failure have always been rationales of regulation no less important than the other objectives; there is now the need to bring back the neglected values of social justice and social solidarity. (Prosser, 2010, p.1) However, the question of the compatibility of the principle of beneficence with the objectives of regulation has yet to be addressed. (Baldwin and Cave, 1999, p.9)

The revitalisation of other rationales of regulation is underway as part of the entire scheme of the expansion of the concept of regulation. Captured as the 'governance turn' and the 'extended concept of regulation', the expansion of the notion of regulation is a highlight of current regulation scholarship. (Black, 2008, p. 141; Prosser, 2010, p.4) The

broadening of the definition of regulation has merits not only in catering for the pervasiveness of regulation but also 'in opening up the plurality of different regulatory objectives'. (Prosser, 2006, p.370) The proposition here for 'beneficent regulation', where the regulatory regime has beneficence as its primary overarching objective, is in line with this expansion of the notion of regulation. Thus, the beneficent regulation of nanotechnology can be defined as the regulation of nanotechnology endeavours for securing its benefits for 'others' where 'others' stands for the residuary group when those who are developing the technology are taken out.

The reference to 'nanotechnology endeavours' is a deliberately wide reference inclusive of all nanotechnology related activities and practices. In ordinary English, 'endeavour' is defined as 'an exertion of power towards some object' (Kirkpatrick, 1983, p.413) and what beneficent regulation purports to do is directing the exertion of power towards achieving advances in nanotechnology towards the good of others. As was the case with benefit-sharing arrangements between biotech firms and biogenetic resource communities, 'benefits' does not necessarily refer to actual research results or nanotech products but broadly to 'the moral obligation independent of actual research results' driven by 'a sense of inclusion and attention'. (Simm, 2007)

The early engagement with questions of benefit allocation, ownership and control is what may distinguish nanoethics from previous ethics and regulation. Answers are sought about who owns and controls the technology and who benefits and who stands to lose. Such questions as to 'the fate of the 'others'' as defined above date back to the early debates in the context of biotechnology where, as singled out by Sheila Jasanoff, 'these questions remain unasked and largely unanswered'. (Jasanoff, 2005, p.186)

The proposition for 'beneficent regulation' is not confined to morality alone. It rather harks back to the broader issue of the ethics-law-regulation nexus. As Beylerveld and Brownsword (2006, p.166) pointed out, moral commitments of a community are not left to 'graze at the margins of the regulatory process.' The nature of the duty of beneficence and the prominence ethics has found in institutional settings among state and non-state actors as well as in supra-state milieus should dispel any reservations as to whether beneficence is a matter of mere morality. Frankena (1982, p.76) has long argued about the possibility of the 'ethics of beneficence' developing into 'a positive social morality' which he described as 'the adoption of a moral code to which non-legal or moral sanctions like praise, blame, approval, disapproval, esteem, ostracism, etc, are attached.' Frankena (1982, p.76) went on to say that '[i]t may overlap with the legal code but it maybe for or against kinds of conduct that are not properly in the province of the law.' Beneficence has certainly garnered the moral commitments required for its crystallisation into a regulatory objective: This can be seen from its adoption as a principle informing regulation in jurisdictions on both sides of the Atlantic. (European Commission, 2004, para. 3.5.1, Presidential Commission, 2010)

A growing interest in such 'moralisation of the law' is witnessed in the current emphasis on the revival of morality following the ongoing financial market crisis. In 'command and control' regulation, regulatees may nevertheless carry out their obligations while deep down they wish to avoid them leading to an unstable society. (Rawls, 1999b, p.589) The current financial market crisis has galvanised approaches that de-emphasise a *modus vivendi* approach in regulatory engagement. Instead of expecting actors to act in a certain specific way or out of fear of the stick that failure to do so entails, there are now demands that regulatees commit to pre/proto legal moral principles. Regulatees are being told to put the 'social benefit' of their ventures ahead of their interests and business considerations. (Demissie, 2010 )

Nanotechnology regulation is ineluctably tasked with the mission of embedding more inclusive values in the governance of the technology. A beneficent regulation of nanotechnology should compel a reorientation of the trend technology has been following and is made to follow. Re-aligning nanotechnology with the demands of human welfare is what its regulation should afford. Beneficent regulation - regulation underwritten by the principle and virtue of beneficence - is what is needed to keep the technology from being vitiated by inferior motives and inferior moral standards that do not prioritise human flourishing.

## Conclusion

The argument for the 'beneficent regulation of nanotechnology' is an exercise in the critique of time-honoured orthodoxies and their baseline assumptions. Justice with its prerequisite objective circumstance, viz., scarcity, is held up to scrutiny and is found wanting when placed against the backdrop of the promises, opportunities and challenges of nanotechnology. Scarcity animates the marketplace, attracts regulation, and vitalises justice. While it is a truism that we are living in an age of 'forced artificial scarcity' (Wong, 2010), it is uncertain how long such a system can hold. What is certain is the need to change it and nanotechnology is set to bring about such a change leading to an unprecedented state of abundance. Is justice conceived with such abundance in mind? The answer is an emphatic 'no'. Justice is not the appropriate regulatory virtue for nanotechnology regulation unless it is tampered with in such a way that it approximates the virtue of beneficence.

The contemporary prevalence of 'forced artificial scarcity' proves that Hume was right in pairing abundance and beneficence as the cumulative requirements to render justice and its remedial applications irrelevant. Then, one may ask whether it is time to raise issues of radical benevolence and accordingly set the research agenda: Is it too early to demand a legally enforceable regime for the distribution of the benefits of nanotechnology in a way that maximizes the prospects of the worst-off around the globe? For starters, nothing of importance is lost in being early or on time. The

danger is in being too late. Rawls (1999e, p.226) cautioned about this danger and his suggestion of the veil of ignorance is aimed at rectifying the biases that take root before people can make decisions about distributive issues. While the veil of ignorance is proposed for purposes of arriving at justice, Sandel inquires whether there is anything that prevents us from using the veil of ignorance to arrive at beneficence instead of justice. (Sandel, 1998, p.45) The timing couldn't be any better than today when nanotechnology is not yet in full swing and comparative advantages are not yet fully entrenched.

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