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Do We Really Live in a 'Risk Society'?

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Abstract

This paper critiques the world risk society theory, the fears of risk and insecurity through globalisation, the possibilities of managing risk from the grass roots perspective from a non-linear approach and considers to what extent we now live in a risk society. Many threats within modern society have strong anthropogenic elements: economic crises, carcinogens in the food chain, climate change, pandemic diseases, conflict and terrorism. The main social threats facing the new modernity are the unintended side-effects as a result of human activity, creating insecurities and uncertainties. While technological progress helps overcome risk in the short term, it becomes self-perpetuating, exacerbating risk in the long term by introducing new and larger global risks, a chain of events known as 'reflexive modernisation'. Through the 'boomerang effect' no one is spared as the risks backfire on those who created them. Ironically, those in the 'scarcity society' are hopeful that by attaining the 'keys of techno-development' they too might become part of the materialistic world. Systemic risks bring about global insecurities, spanning across state borders, and can become politically reflexive which could prove highly destructive, instigating catastrophe, or alternatively could trigger cross-border, global unity.

Keywords: *Risk, Risk society, Adaptation, Vulnerability, Hazard, Reflexive modernisation, Systemic risk, Existential risk, Modernity, Cosmopolitanism*

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1. Introduction

Living in a nuclear, hi-tech society is perceived as being potentially more risky than it has perhaps ever been. Today, with constantly evolving techno-science, such as the development of jet travel and instant communications, a globalised 'shrinking world' has been created. The more technologically advanced the developed world becomes, the more modernisation introduces new threats and uncertainties. Life styles have become intertwined within invisible risks such as nuclear radiation, pesticides and atmospheric pollution and such threats spread across borders becoming macro-level risks. Within a modern society, risk is associated with threatening powers and globalised insecurities (Beck, 1992, p. 21). This paper intends to argue that though modern society holds many risks, through new modernity, these risks will increase further and so we do not yet really live in a 'risk society'. Firstly, it is intended to define what is meant by 'risk society' and its associated terms, then to analyse theories surrounding this issue, before finally establishing to what extent we live in a risk society.

2. What is a 'Risk Society'?

Before determining whether we live in a risk society, it is important to firstly establish what this means. Beck (2006, p.333) defines a risk society as 'an inescapable structural condition of advanced industrialisation'. Modernity is viewed as being brought about through changes and advances in technology and following from this the changes in society, power structures and peoples' perception of reality, or norms (Beck, 1992, p.50). Beck (1988, pp.120-121) distinguishes types of risk as: pre-industrial risks[1], industrial-age risks[2] and late modernity risks[3]. Beck (1992, p.19) posits that there has been a paradigm shift from modernity to the 'second modernity', no longer concerned with wealth and power but coping with risks. The wealth-distribution in a society of scarcity has changed to a risk society from the 'genuine material need' to the 'exponentially growing productive forces in the modernisation process' (Beck, 1992, p.19). Moore's law indicates that technological advancement grows exponentially, doubling every eighteen months, through computerisation (Moore, 1998). Technology policies have to be created and adapted alongside technology (Metcalfe, 1995, p.25). Contemporary risks, are related to threatening powers of modernity and to its globalised uncertainties. However, spatially not all societies have shifted from material need to technological productivity although this inequality is shrinking through globalisation. Since Beck (1992) proposed the theory of risk society of modernity, technology has further advanced, producing huge differences in social structure. In this sense, we live within a transitional phase, with society adapting to the dynamic and reflexive environment whereby society continually evaluates itself, initiating change with potential larger modernity risks.

[1] Pre-industrial risks were brought about by natural phenomena, extrinsic to society.

[2] Industrial risks were caused by social behaviour and human decisions. This kind of risk was spatially specific and society was responsible for them.

3 Late modernity is a phrase coined by Beck in which he refers to the continuation of modernity. It dates from around the 1980s to the present day, a time of globalisation, consumerism and greater diversity. Beck discusses this period as a time when risks are inflicted on us from without. These risks are caused through reflexivity bringing about technological advancements which can have a worsening effect.

2.1 Risk

Risk is defined by Beck (1992, p.21) as 'a systematic way of dealing with hazards and insecurities induced and introduced by modernisation itself'. A risk is defined as:

> 'the probability of harmful consequences, or expected loss of lives, people injured, property, livelihoods, economic activity disrupted (or environment damaged) resulting from interactions between natural or human induced hazards and vulnerable conditions'. (UNDP – BCPR, 2004, p.593).

Risk is perceived as attached to socio-ontological approach of human perception. It is socially constructed through social cohesion and interactions sharing knowledge of known risks.

Beck (1992, p.3) argues state institutions such as laws predetermine reactions to risk, whereby individuals with similar rational behaviour act in similar manners. Therefore, people living within a closed society perceive risk in a similar way however, emerging globalisation has meant that societal structures are becoming more diverse with new risks becoming the norm.

2.2 Associated terms

While risks are uncertainties about the future, hazards are different in that they are the potential occurrences. However, techno-economical hazards alter society's risk perception creating insecurities and decisions based on previous hazards. Global hazards such as terrorism, climate change and the spread of disease across borders have become the discourse of civil societies.

A hazard is defined as someone or something that can cause harm such as electric cables or CO2 released into the atmosphere. Hazard according to UN / ISDR (2004, p.582) is:

> 'a potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation'.

The risk of such hazards occurring is the chance, whether high or low, that the hazard might potentially cause damage. Risks are the anticipation of the hazards and are brought on by science and mass media. The risks associated with the hazards are therefore forward-looking concepts which implies that hazards could potentially happen in the future.

As risk and vulnerability are often used synonymously to describe potential adverse effects, there is therefore a need to also define vulnerability. There is a difference, with the hazard being the potential, damaging event with its particular intensity, vulnerability being the relationship between the amount of hazard severity and the damage it has caused and risk being the potential expected loss due to the hazard over a given time period.

There is a measure of risk in most people's lives, underpinned by uncertainty of outcome (Smith, 2013, p.3, 4). The difficulty in categorising risk is that it has no one set definition and is filled with uncertainty, otherwise it would not be a perceived risk – 'We don't know, what it is that we don't know' (Beck, 2011). It is generally accepted, risk is a human concept defined as potential losses due to hazards and

intensity of vulnerability. Assessing possible risks build on past events but also need to cover potential future events to decide on the likelihood of the occurrence and the subsequent losses which could be incurred so as to design disaster risk reduction and possible interventions to manage risks.

To lessen unfortunate events, people assess and estimate risks involved to themselves. Risk assessments can be considered under two components as stipulated by Chauvin and Hermand (2002, p.1) taking the objective and quantifiable risk assessment of experts into account as well as subjective risk assessment of those exposed to the risk within the vicinity. Quantitative assessments are concerned with the probability of the event occurring and enormity of the harmful effects whereas qualitative assessments are based on risk perception regarding potential devastation.

It is impossible for humans to mitigate environmental hazards such as earthquakes, floods and heat waves but instead to attempt to protect people against the hazards by lessening the impacts of disaster, beginning with hazard identification, estimation of probability of event and then to attempt to evaluate the effect of the event on the social impact so compiling a risk assessment (Smith, 2013.p. xxiii). A risk assessment can never be perfect because of the uncertainty involved and because it is a human concept based on intangible, subjective evidence which alters between different people. Furthermore, the degree of success of any risk management plan is dependent on risk assessment.

3. Examining the Risk Society Theory

Beck (1992, p.19) puts forward the argument that risk is fundamental to capitalism with wealth being accompanied by social risks of advanced modernity. He views modernity as technology changing and advancing and as it does, societal norms, power structures and peoples' perception of reality also change (Beck, 1992, p.50). Since Beck (1992) proposed the theory of reflexive modernity, technology has hugely advanced.

Modernity is inherent within the capitalistic society with capitalist consumerism constantly seeking to replace old technologies with new. Therefore, risk is constantly evolving and with advances in techno-science there are new attached risks because within reflexive modernity, threats to industrialisation create further modernisation which serves to bring about greater risks (Beck, 1996, p.34). Thus, 'the concept of risk is directly bound to the concept of reflexive modernisation' (Beck, 1992, p.21). For instance, France's policy, to adapt from coal-fuelled power stations to nuclear power stations only serves to create additional risk because if a nuclear power station fails there are far more severe consequences than a faulty coal-fuelled power station failing. Reflexive modernisation has bi-directional cause and effect where techno-industries can create uncertainties attempting to alleviate risks through 'scientification' (Beck, 1992 p.21). The problems with technology overcoming burning fossil fuels can be illustrated by the effects of the Chernobyl disaster in 1986, resulting in radioactive fallout over international borders with thousands of victims suffering fatal cancers. Threatening forces of the new modernity through political reflexivity can lead risk societies into becoming world risk societies. Societies can become reflexive with global repercussions with their problematic risks triggering institutional aid leading to global alliances and the removal of political boundaries to overcome risk, thus leading to greater global cooperation. Climate change for example is a global risk spanning across political borders which will have major effects lasting for generations. Society is aware that there are consequences attached to their actions and this risk consciousness has led to a frame of mind where society constructs reality in accordance with their perceptions of risk.

While technological innovation potentially helps overcome risk, in the short term, it only brings about new and larger risks in the long term, which detrimentally affects the biosphere of the planet (Beck, 1992, p.22). About a hundred years ago, icebergs were considered a major threat to ships navigating over the Atlantic. However, modern technological innovation overcame this problem, by providing the solution of aeroplane travel and the invention of radar to locate icebergs. This is evidence that technological advancement overcomes societal risks and enables people to adapt to the adverse circumstances temporally in which they find themselves. Of course, technological change is not always for the best; technology can be globally destructive as well as constructive. For instance, the invention of the Internal Combustion Engine emitted greenhouse gases. Since the Industrial Revolution, human-induced carbon emissions, from the burning of fossil fuels, have been instrumental in global climate change. Technologies are generally known to bring about their own risks, which is defined as ways of coping with hazards and anxieties (Beck, 1992, p.19). In modern society, risk is related to threatening powers and globalised insecurities which Beck (1992, p.21) asserts are 'politically reflexive'[4]. The concept of risk is connected to reflexivity because once society becomes challenged at global level, awareness of this risk tends to trigger international global cooperation of institutes. (Beck, 1996, p.2).

Although developed societies are protected from the hazards faced by the Developing world, linked to poverty and climate-sensitive health risks, modernity of the developed world opens up new risks through the social boomerang effect[5] which pays no heed to wealth. What characterises this threat is the lengthy time gap between initial exposure and consequence. Genetically Modified Crops (GMCs) in one country imported to another has circulatory effects impacting upon the victim as well as those who profited from the risk. In this way society has fundamentally shifted to a risk society made challenging by environmental hazards that affects traditional inequalities. The argument here is in a world risk society everybody is equally affected regardless of spatial location (Beck, 1992, p.36). Modernisation, in this respect, is an equalising aspect, jeopardising health, food and nutrition through increased global travel which can cause cross border health risks leading to the spread of communicable diseases such as Malaria and Tuberculosis (World Health Organisation, 2016). Social class is broken down in this respect with economic and ecological disasters such as climate change moving across borders taking no notice of affluence, not only proving a hazard to health but also a hazard to property and profits (Beck, 1992, p.26).

Development of new technologies within modernisation are surpassed by political management questioning the associated risks with governments and institutes overseeing and controlling and concealing hazards, with the public often unaware of the risks, yet being assured of security (Beck, 1992, p.20). The modernisation process works within this system, as within a 'scarcity society'[6] assurances are made of liberation from poverty by serving the needs of material wealth offered through the 'keys of techno-development'[7] (Beck, 1992, p.20). Side effects from this techno-development can be 'a catastrophic' risk society with the social and political potential side effects,

[4] Politically reflexive modernisation includes global issues such as sustainability so as to maintain advancements that will benefit and support human life without jeopardising the planet for future generations.

[5] Beck suggests that risks have a 'boomerang effect' whereby those who produce the risks will also suffer the consequences by becoming exposed to them themselves.

[6] In a 'scarcity society' there is competition for resources; there is a basic economic problem with a gap between limited resources and theoretically limited wants.

[7] The belief that technological development is the means of achieving materialistic wealth.

such as toxic spills. In this way, modernity has become the means of liberation from the threat it has created but has become the threat itself (Beck, 1992, p.183).

Risks are founded on modern thought patterns (Douglas, 1985) and risk is perceived through constructivist conceptualisation. Beck (1992, p.28) claims risk constantly consumes people and affects their day to day life and physical risks are 'learned' perceptions (Wildavsky and Dake, 1990, p.42). Some social groups are affected to a greater extent than others by distribution of growth risks. Compared to the educated, the disadvantaged have less opportunity to avoid risks and affluence can buy safety (Beck, 1992, p.35). Furthermore, risk is determined to a large extent through knowledge or 'consciousness' and so those who are uneducated are unaware of the risks whereas the educated tend to read about potential risks. Therefore, people are affected by class for their risk position: 'in class positions, being determines consciousness, while in risk positions, conversely, consciousness (knowledge) determines being' (Beck, 1992, p.53). In this way, it can be argued that there are social class differences yet in the 'boomerang effect', a different distribution logic comes into play, suggesting that the wealthy people, responsible for polluting, will have to pay when they too are exposed to the risk (Beck, 1992, p.23).

3.1 Paradoxically, risk evades perception

Societies have always had risks such as the plague and famine but Beck (1992, p.27) sees contemporary, post-modern society as having non-calculable risks with potential spatial and temporal risk patterns that can evade perception. Ironically, while risk is a person's perception of what is to come in the future, risks evade perception. Beck posits many contemporary risks are imperceptible and the hazards can go unnoticed to the victims, perhaps not taking effect during their lifetime (Beck, 1992, p.27). Imperceptible risks like nuclear and chemical contaminants, air and water pollutants, civilisation diseases and pollutants in food chains can threaten people without their direct perception and without them being hazardous to themselves but instead proving hazardous to subsequent generations. For instance, the Bhopal gas leakage in 1984, not only killed about 3,500 people but also affected second and third generation children with approximately 2,000 children diagnosed with congenital defects (Dixit, 2015). Risk assessment can therefore be said to be historically specific, in the sense that within particular historical periods social understandings of risk relate to circumstances specific to knowledge within a given cultural environment.

Foucauldian accounts of risk and governmentality have a different perspective to Beck's, seeing risk as governed by a heterogeneous collection of institutions and practices who manage and regulate populations (Lupton, 1999, p.87) through self-regulation of norms. Beck however argues that state institutions such as laws and religious behaviours predetermine reaction to risks with individuals with similar behaviours acting in similar manners. Foucault's perspective of risk particularly differs from Beck's in his belief that risk is governed by institutions and therefore measurable, based on collective populations rather than individuals. The risks are more calculable, managed by identifiable rules and in this way are insurable. However, Beck asserts that risk is based on individual constructs and therefore is uninsurable as individual probabilities cannot be measured (Aradau and Munster, 2007, p.91).

Though Beck's and Foucauldian theories have some similarities essentially, in that they agree that risk is socially constructed by human perception and risk in western societies are inescapable political and cultural, human concepts which have to be managed through self-intervention, with risk being connected to choice and responsibility (Lupton, 1999, p.93), Beck differs in his view of the autonomy

of the individual in a modern risk society. Beck believes the individual is unfettered to a large extent, having sufficient liberty to make choice, rather than Foucault's social structure (Hudson, p.12, 13). This explains Risk Society as having individuals who have awareness of the fatalistic consequences their actions have played in the growth of modernity. Discourse surrounding the norms of Foucauldian behaviour of groups of people whilst not coercing them, nonetheless motivates them into self-regulating to expected norms through interventionary disciplines of institutions designed to transform their lives where resistance to such strategies are deliberately made difficult. In this way risky populations are identified and kept under surveillance (Lupton, 1999, p.93) whereas in Beck (1992), individuals make their own decisions. Beck's theory of a risk society undermines traditional risk management whereby he states 'insurance protection had a twofold function from the perspective of social theory, namely, neutralising damage and thereby neutralising fear' which is unworkable because the growth of risk surpasses insurance, losing its ability to counteract social and political fear (Beck, 2008, p.139).

Misconceived risks, even if irrational is 'real'; it is not only the hazard but the way the hazard is perceived that is of significance. Apprehension in the modern world mainly arises from the post-war era which gave the benefits and risks - nuclear power, pesticides, air pollution (Ropeik, 2004, p.S56). However, with knowledge comes concern over potential risks and with the growth of information through global media sources, there has become a growth in perceived risk. There is exposure to dramatic, and often urgent messages about potential threats through media reports which affect society's attitudes and can lead to dangerous decisions. For instance, the 2001, USA, anthrax attacks prompted 5% of Americans to purchase antibiotics and 20% used them as a preventative measure. Overuse of antibiotics has encouraged their ineffectiveness (Ropeik, 2004, p.S58). Adler (2003, p.977) argues that the effects of fear can be harmful to health, just as much as physical harms from pollutants. To gain the trust of civil societies so people engage in becoming involved, risk communication is more effective when it sets modest goals which show how society can play a valid part (Ropeik, 2004, p.S60).

4. Globalisation and the spread of Capitalism

It is the people, who are living through this transitional phase, who are put at greater risk as capitalist industrialisation grows, and they become aware of the potentially irreversible risks they have brought upon themselves. Beck posits, the root cause of environmental risk is capitalist consumerism with technological reflexivity attempting to mend the situation without actually tackling the cause. Risk is therefore fundamental to capitalism with wealth being accompanied by social risks. However, though there is reflexive knowledge, global society is not 'master of its own destiny' within the capitalist system (Beck et al, 1994, p.1).

In Western Society, neoliberalism intensifies competition and accelerates economic growth encouraging production and consumerism in wealthy states (Grosvenor, 2015). This is because neoliberalism has actively promoted the economic market as interconnected and as a way of life with competitiveness being essential. There is debate about the current socio-economic system requiring transformation because of the global threat of climate and economic crises. However, the need for finding new approaches to overcome social and economic crises is no new thing.

Verhaegne (2015) suggests neoliberalism assumes the Christian idea that people are inherently, through constructivism, unrestricted in their competitive nature for economic growth. However, there is a relentless quest for consumerism and productivity to enhance society's needs and desires. By 2050, with a global population of about 9.6 billion, 'the equivalent of almost three planets would be

required to provide the natural resources needed to sustain current lifestyles' for the global population (UNEP SLEP, 2016).

Boulding (1966, p.7) addresses this in the spaceship theory, pointing out that the take-make-dispose economy has to change because of the limited resources. Boulding's (1966, p.8) theory is that if humankind hopes to achieve a sustainable economy there would need to be a change in mind-set. There needs to be a new constructive narrative, instead of consumerism, one of social responsibility for oneself and the planet. Boulding (1966, p.2) made a comparison between open and closed economic systems. As the economy exists in an environment which is part of an open system, there are only limited resources available on a finite planet. This has major implications for social dimensions because, with excessive consumerism, the planet's resources will eventually run out. Unlimited consumerism is an obvious socio-environment systemic risk which would initially have huge impact upon the poorer populations of the planet but ultimately affects everyone.

It is because of the deterioration of the environment through society's greed for materialistic consumption that there has become a need for an economy of permanence. There is a requirement to move away from success measured through materialism. Boulding (1966, p.7) describes the economy based on consumption of the finite reserves of the earth as the 'cowboy economy'. The cowboy economy is based on a 'take-make-dispose' consumer-led economy, determined to increase throughput. Such a society is a throwaway society, with its ever-increasing carbon footprint, which creates affluence for some, poverty for many and future generations facing major risks of over-production and over-consumption.

The alternative economy is a society of permanence, where there is sustainability. Boulding (1996, p.7) calls this alternate the 'spaceman economy' which meets the needs of society but recognises the importance of regenerative nature. The pursuance of sustainable economies for permanence eludes societies, with their insatiable demands for resources from their environment. Relative permanence can only be attained through social 'service' which is selfless contributions (Kumarappa, 1945, p.13). This would entail 'gregation' with communal benefits instead of private benefits and 'enterprise' by donating initiatives in return for private benefit.

The consequences of severe resource shortages can be illustrated by the humanitarian crisis which has arisen in Venezuela, for many reasons though not the lack of potential wealth. Tens of thousands of Venezuelans are at risk of starvation and some 80% of the population are living in severe poverty. The exodus from the country is putting pressure on Venezuela's neighbouring countries, with the number of migrants entering Peru quadrupling over a four-month period from 100,000 in March, 2018 to 350,000 in June 2018 and still increasing. The risk of resources in a finite world running out, through over consumption in a materialistic world, would therefore have severe consequences upon the population of the planet (Freier and Parent, 2018).

5. Systemic Risks

While globalisation brings many benefits, global interconnectedness also exposes people to systemic global risks which are:

> 'risks imposed by inter-linkages and interdependencies in a system or market, where the failure of a single entity or cluster of entities can cause a cascading failure, which could potentially bankrupt or bring down the entire system or market' (Mourad and Luers, 2017, p.109).

Many catastrophes relate to social problems, which can include food and water shortage, war, migration and epidemics, often relating to population growth and density, or social and political instabilities. Systemic risks, can trigger unexpected large-scale changes in a system or apply uncontrollable threats.

Anthropogenic climate change is a potential systemic risk because it has the possibility to intensify global weather events which trigger the risk of humanitarian crises; it has the possible side effects to cause natural disasters, conflicts over food and water shortages, migration and socio-political instability (Helbing, 2010). In 2015, due to increased heat-related effects, the Zika virus epidemic spread across Latin America and the Caribbean; Hurricane Maria in 2017 heightened the risk in mosquito-borne disease through water contamination and droughts which has brought about food scarcity, contributing to conflict and forced migration. The 2007 - 2010 drought was accompanied by crop failure, which potentially contributed to the Syrian conflict and mass migration of farming families (Kelley et al., 2015, p.3241).

Potential climate change can lead to disruptions in infrastructures, trade, food and water and health. Its effects can be direct and indirect and as economic and social systems are deeply enmeshed, societal systems become more susceptible to the knock-on impacts. Additionally, risks spread across sectors, and regions can become of such intensity that their effects can have greater impact than those of domestic climate related hazards (Mourad and Luers, 2017, p.110). There is great uncertainty about how to manage systemic risks because of the domino effect on systems and uncertainty about causes (Schwarcz, 2008, p.198).

5.1 Has a critical stage in risk been reached?

Accelerated technological progress within modernity now means that this critical phase has been reached whereby there is the unprecedented opportunity and risks of nanotechnology and ultimately the potential for global existential risks which make anthropogenic risk management no longer viable and where the global effects are unrecoverable. As Bostrom (2002) posits *'If we don't know whether something is objectively risky or not, then it is risky in the subjective sense'*. In other words, when we do not have any objective sense of the risk we can encounter, then we must subjectively estimate the consequences of the risk; there is no room for trial and error actions.

One example of an existential risk is the Bang theory where humankind could become extinct through sudden disaster or deliberate action such as a terrorist nanotech attack; a highly virulent genetic virus released either intentionally or unintentionally; a pandemic virus becoming prevalent through greater ease of global travel and food-trade. Alternatively, the crunch scenario could occur, whereby

humankind could survive the global hazard but be substantially knocked back in their technological intelligence; a world government could become preventive of intelligent progress; some countries could become less able to build institutions supportive of progress. The Shriek theory suggests that a world government could form with very different desired goals and values which may be repressive to global advancement. Finally, under the whimper theory, whereby states progress along lines that are not wholly valued by societies or are not best achieved. Surely, there should be international actions and an institutional framework agreed upon greater research into the potential risks of existential hazards and their objective global handling should they arise. However, Bostrom (2002) points out there is more research into the life-habits of the dung beetle than into existential risk - as Beck (2011) posits 'the act of denial or apathy'.

6. Social construction

Beck (1992, pp.22-23) posits that risks such as climate change are socially constructed. This infers that through constructivism, perceptions could be changed or minimised with knowledge. As recommended by Risse (2004), rather than been regarded as a theory, social constructivism is best considered a critical perspective especially useful for academically challenging accepted principles of globalisation processes. Constructivists believe by creating cognitive frames showing alternatives issues, people's norms and perceptions can be altered.

Constructivism attempts to reinterpret issues by persuading the masses by setting new norms. This new idea is cascaded through pressure to conform to the new perception and finally the new norm internalises with the masses collectively agreeing on the reinvention, which is termed the 'tipping point' or acceptance of the change (Finnemore and Sikkink, 1998, p.895). In this case the 'tipping point' would be acceptance of sustainability in the developing world with less emphasis on materialism. To change consumption patterns needs a complete cultural overhaul and furthermore, less consumerism could bring about economic recession and unemployment risks.

It is the collective perception of reality that is important, to enable a U-turn in society, setting modest goals to engage society such as using the same plastic bag for shopping, separating refuse into cardboard, plastic, garden and kitchen waste. However, as Hall (2006) points out, this does not get to the root cause as purchasing an apple in the developed world can mean throwing away packaging, so creating wastage which has used energy to create.

Plastics threaten ecology, add to climate change through making of the product, and affect the wellbeing of people by entering the food chain. However, within only 6 months of introducing a charge on plastic bags in the UK in October 2015, consumers used about 6 billion fewer plastic bags, saving some 40,801 tons of plastic (Morley, 2016). This demonstrates how small social actions can have huge consequences. Carrying a reusable bag and recycling plastic bottles can have positive effects because plastic is one of the main ocean pollutants (UN SDG 12).

Plastic bottles, like plastic bags, are hazardous to the planet. Queiroz et al., (2012, p.328) describes this phenomenon of packaging water in plastic bottles to sell water as 'one of capitalism's greatest mysteries' considering drinking water is freely available in most developed nations. However, in the USA alone, more than 30 billion bottles of water are produced and sold per year (Gleick, 2010, p.ix). It is big business even when about three litres of water are used to produce one litre of bottled water (Pacific Institute, 2007, p.1). This societal habit is an incredible waste of the planet's finite resources, detrimental to the ecological environment and adds to global climate change. Again, it is a social

dimension which could make a difference to the economy, transforming it from the ground up. However, societies need to be 'nudged' through subtle policies and financial incentive to change their behavioural habits, which has proven successful. The incentive for society to take action can be reached through a top-down approach from strong government policy so long as the majority are on board with the decision. Also, for success, there is a need to maintain a balance of power between civil societies and powerful interest groups, intent on economic growth (Schick, 2014, p.14).

The IPCC posits 'changes in lifestyle and behaviour patterns can contribute to climate change mitigation across all sectors' (IPCC 2007b, AR4), which suggests that all policies need to aim at a structural socio-behavioural change in production and consumption patterns to reduce the risk to future society (Beck, 2010, p.255). The Green Economy Initiative (GEI), launched by the UN Environment Programme (UNEP) in 2008, gave recognition to social dimensions stating 'People are at the center of a successful transition to a world of far-reaching and balanced global reduction in emissions and enhanced resiliency' (Prats, 2011, p.8). Beck agrees stating it is 'the missing sociological link' which is important to address perceived threat. Proponents welcome the idea of social dimensions being central to the Green Economy as 'socio-behavioural dimensions are crucial for effective policy-making' (Pongiglione and Cherlet, 2015, p.383) since environment is governed by social dynamics.

Each year approximately one third of food produced, 1.3 billion tons, worth around $1 trillion, rots in consumers' and retailers' bins, or rots in transportation and harvesting practices (UN SDG 12). People can be persuaded through social constructivism to behave in a greener and socially responsible manner especially when others behave similarly with 'pilot projects aiming at triggering or enabling behavioural change on high impact sectors, such as waste prevention and reduction' (UNEP SLEP, 2016, p.13). There is the need for grass-roots participation to prevent excessive consumer waste. For example, projects such as using energy efficient lightbulbs have proved very successful, making a significant difference. This change in mind-set, with people now using energy efficient lightbulbs, has effected a global saving estimated at $120 billion per annum (UN SDG 12).

It has been found consumers can systematically undervalue energy savings from energy efficient vehicles but can be incentivised through social constructivism, to purchase through carbon tax incentives and subsidies which gives perception of better value (IPCC, 2014 WGiii, p.253). Some businesses will conform to take actions consistent to green policy, moving away from profit-maximizing through the constructivist approach (Lyon and Maxwell, 2007, p.745). Isolated businesses tend not to be as open to green issues as those organisations with a variety of workers who share their diverse ideas (Williamson, 1975). This is a strong reason for climate change politics to include social dimension so those at the grass-roots can be constructed into seeing green actions as the societal norm. The social dimensions of risk need to be considered by researchers in risk analysis because it is essential to warn, protect and most significantly persuade people of the efficacy of considering hazards and possible resolutions they could bring to bear to ameliorate the hazardous situation (Short, 1987, p.167).

Weber (2005, p.xviii) maintains that our fate is dictated by an 'iron cage' which, through constructivist norms, traps Western capitalist societies into the pursuit of materialism. For instance, we cannot but accept that our wellbeing may come from the satisfaction we feel when we acquire the newest model of car. Our constructivist global view is shaped by 'the economic cage' we are born into, our 'techno-rational thought and capitalism' (Cole, 2015). However, through constructivism this 'iron cage' should be able to be changed and this is one reason society needs to be encouraged to be on board to action necessary change to construct a new reality.

Risk and uncertainty can bring about cosmopolitan cooperation, with political and societal coalescence of ideas. For example, 9/11 illustrated how globalisation enabled terrorists to use the internet, open borders and planes to attack the westernised world and its outcome gave new focus on combatting global terrorism and for countries to aggressively address the risk of global terrorism. Change has come about because of the possible risk of radical groups targeting the States.

Beck posits that many risks such as ecological degradation, terrorism and climate change require global solutions through cosmopolitan democracy (Martell, 2008, p. 129). For example, the Kyoto Protocol, which came into force in 2005, brought developed countries together to reach their reduced greenhouse gas emissions targets. At the 21st Conference of the Parties of The United Nation Framework Convention on Climate Change (UNFCCC), COP21, 195 countries agreed to adopt the consensus to address shortcomings in the Paris Agreement. Another global initiative was the Millennium Declaration of 2000, which formalised 18 Development goals to reduce global poverty, improve lives and help in a sustainable future (Smith, 2013, p.21).

What is of particular significance is that risk is continually evolving and as Beck believes has now reached a metamorphic stage in its existence within modernity. It will either bring about environmental, social and political disaster or through its cosmopolitanism could bring civil society together across country borders in agreement for the need to 'save the world' from catastrophe - whichever way, it is an uncertain future that humankind faces. Cosmopolitan in this context does not mean global but that 'traditional borderlines between the inside and outside, between national and international are not retained – in order to get new mixtures between the inside and the outside' (Wimmer and Quandt, 2007, p.343). Beck's world risk society offers an element of hope and is not intended as an inescapable catastrophe society - to demonstrate by metaphor, a cliff can be avoided by a change of direction (Beck, 2013, p.8). However, though Beck points to the optimistic belief that the risk of climate change could spell cross-border partnership and could become 'an antidote to war' it is debateable whether nations will together fight against an 'invisible enemy' (Beck, 2016 ch. 4). Beck himself points out that nations use politics of 'invisibility' to enable them to use 'bads' - the IPCC propose nuclear energy as one of the substitutes to fossil fuels and institutions that produce this nuclear energy are the same institutions that assess the nuclear risks therefore the risks become invisible.

To technologically improve, people tend to think in a linear way, rather than looking at the problem from a different angle. This leads to greater problems. For instance, the electric Nissan Leaf, takes lengthy charging and requires regular replacement batteries, relying on energy intensive production (Hoffmann, 2011, p.4). Instead of taking a larger systemic view on the transport problem, linear thinking simply shifts the problem.

Instead of linear economic advancement with resources being extracted, used in production and discarded as waste, The Cambridge Institute for Sustainability Leadership (CISL) recommends 'Rewiring the Economy'. Rewiring the economy develops a circular economic system, capitalising on resources by restorative design and eliminating waste. This would potentially uphold the social dimension principle (easac, 2015, p3). Instead of a 'take, make, use, waste' linear economy, resources would be recovered and reused in an alternative function – a sustainable economy. For instance, circularity is made easier with sharing economies such as digital platforms where one person's waste is utilised by another user (World Green Economy Organisation, 2018, pp. 24-27).

Global risks can only be addressed in a holistic way with joint efforts by multilateral institutions as through the millennium goals and by global civil societies prepared to hold responsibility for their actions to help mitigate or use adaptive responses.

7. The Need for Adaptation

Beck (2008) believes that a cosmopolitan openness could lead towards tolerance to others which would lead to greater transnational cooperation. Global communication helps in discussions on climate change risk, particularly adaptation, such as the 2015 COP21 Paris Climate Conference. The objective of adaptation is to lessen vulnerability to climate variability and climate change by enabling preparation for response (IPCC 2007a AR4 WG11).

Climate adaptation is important because regions need to deal with climate change in their own locality, perceiving their vulnerability within their situational context and having cognitive behaviour which enables them to cope and adapt to hazards of climate change such as potential localised heatwaves or floods (Adger, 1999, p.250., O'Brien, 2006, p.50). For instance, Whitmarsh (2008, p.351) believes residents in UK areas susceptible to flood, often have no clear perception of the link between flooding and climate change and rarely see reoccurrence as likely because of climate change. A large part of coming to terms with conceptualising the social dimensions of risk and the need to adapt to climate change is beginning to understand vulnerability (Wolf, 2006). As Bandura (1977, p.191) points out, self-efficacy can affect perceptions. For instance, elderly people may not feel or be capable of proactive adaptation strategies and believe nothing can be done as a preventative measure against the risks presented by heat (Wolf et al., 2009, p.185, 190). Because social dimensions within climate change have become recognised in the risk assessment process as significant, since Beck (1992) there has been an increasing body of research into this area (Eakin et al., 2009, p.224).

People in the modern world need to adapt to the risk society they live in. For example, even with mitigation attempts, climate change is likely to have extensive consequences with impacts such as flooding, drought, sea level rise, and such extreme weather conditions could lead to food shortage, infrastructure damage, destruction of ecosystems and these systems would need to adjust to the stresses in a process of adaption, through resilience, sensitivity and vulnerability (Berkhout et al., 2006, p.137). Adaptation, as defined by the IPCC (2007a AR4, WG11) as 'adjustments in human and natural systems, in response to actual or expected climate stimuli or their effects that moderate harm or exploit beneficial opportunities'.

By anticipating the adverse effects of climate change, appropriate action could be used such as developing drought-tolerant crops, using tree species less vulnerable to fires or building innovative flood defences. This ability to adapt would differ according to different regions but would provide coping strategies in the areas that most need them. The limitations are that developing countries lack the financing, knowledge and resources to put the required adaptation strategies into action. Finding a solution to this is made more difficult because as Middleton and O'Keefe (1998, p.12) point out 'people are vulnerable because they are poor and lack resources, and because they are poor and lack resources, they are vulnerable'; what appears a tautological conundrum. In other words, there is a dichotomy with cause and effect on the one hand producing a chain of explanation and access to resources on the other hand; root causes of vulnerability coming from different aspects. Also, each time there is a disaster, the vulnerable suffer the most and are made more vulnerable the next time there is a disaster; a vicious circle of events.

8. Addressing cultural and political inequalities

Beck draws attention to the global inequalities that interconnect through the boomerang effect - the visible hazards and the imperceptible risks of health for instance. In Bhopal, it was reported:

> 'A toxic cloud escaped from a chemical factory and settled like a shroud over sixty-five thickly settled square kilometres; when it finally dissipated, the sickly-sweet smell of decay was spreading. The city had turned into a battlefield, in the midst of peace. Hindus burned their dead-on cremation pyres, twenty-five at a time. Soon there was a shortage of wood for the ritual cremation - thus kerosene flames licked around the corpses' (Beck, 1992, p.110).

The boomerang effect, as Beck posits, eventually returns to strike the affluent states which had anticipated they could transfer their business overseas; side-effects of pesticides for tea and cocoa beans eventually returning.

Compare the paradoxical nature of health in the affluent risk society:

> 'Sooner or later, countries enjoying a sustained growth in their national incomes get confronted with the increasing healthcare costs caused by the spread of non-communicable diseases, such as obesity, cancer, hypertension and heart dysfunctions' (Chatalova et al., 2016, p.1).

Rapid transportation and global distribution of food is transferred between countries. Low-income groups are especially at risk, particularly urban children, eating low cost and low nutritional foods. Ironically, those in the 'scarcity society' are hopeful that by attaining the 'keys of techno-development' they too might become part of the materialistic world (Beck, 1992, p.20).

Beck makes comment on the complex interplay within reflexive modernity between political agenda through capitalism with the side effects brought about by industrial production and climate change risk. Within the wealth of modernity, Beck reveals future risk seems unimportant and generalised between wealthy and poor, the north south divide, whereby he uses the case study of food chains, globally connected. Likewise, the main thrust of Baer and Singer's argument is that climate change risk is deeply entrenched in the capitalist system with its greed for production and large polluting emissions. Thus, they argue, health, being intertwined with anthropogenic climate change, should be viewed as a part of a political-economic system which cannot be transformed until capitalism is replaced by a democratic eco-socialist world system.

The IPCC identifies health disparities, often intrinsically bound into the capitalist system, which Farmer (2004, p.307) calls 'structural violence'[8], with political economies worsening social health inequities. Packard (2007) also agrees research has shifted from reliance on biomedicines for vector borne diseases (VBDs) towards the necessity of recognising the link between socio-economic development and the resurgence of VBDs. Therefore, developing countries such as India suffer from expanding populations without adequate facilities and poor infrastructure and people inhabiting slums being more vulnerable to climatic disasters and VBD thus experiencing health inequities (Packard, 2007. IPCC, 2014). It is this disparity of global societal risk that makes it essential researchers should take account of causal social dimensions. Social dimensions such as race and ethnicity can lead to social disadvantage which the IPCC have ascribed to various social financial circumstances preventing purchasing of air conditioning during heatwaves for instance, social disadvantage such as living in regions where there is poor health, poor sanitation, lack of education, poor infrastructure (IPCC, 2014, WG II).

Roll Back Malaria[9] which assesses the risks of climate change on global malaria transmission cautions their results indicate future climate could potentially become more suitable for malaria transmission in tropical highland regions but socioeconomic factors like land use change, population growth and urbanization, migration changes, and economic development all have to be included in future risk assessments (WHO, 2015). Beck (1992, p.44) talks of the cultural and political concentration of risk with inequalities between the wealthy countries and the developing world. In some areas such as Surat in India we see social violence Farmer (2004) spoke of with economic wealth of industry amongst abject poverty of people in slums subjected to the risks of poor sanitation and disease (enda tiers monde, 1996, p.7, 8).

9. Conclusion

There is uncertainty about causes of systemic risks and how, if at all, they can be managed. The irony of risk is that it is a possibility of hazard, the unknown, and an uncertainty of a threat or disaster and because society can only judge risk by what has occurred in the past, then when an unknown disaster happens it can prove difficult or even impossible to control (Beck, 2011). The problem with the world risk society is that the risks are not localised but are omnipresent and are based on uncertainties and the unknown, and furthermore they can be irreversible and uninsurable. If climate change should become irreversible then it needs to be prevented and so adaptation is not sufficient in the long term.

It is undeniable that modernity has seen many global changes however it is more than just change in the world; Beck uses the analogy of metamorphosis with the old uncertainties within the risk society having fallen by the wayside, replaced by a far greater transformation. He speaks of the reorganisation of weakened borders between nations and cosmopolitanism and within this paradigm of transformation we are a 'digital world' at risk.

[8] Farmer defines his concept of structural violence as: '... social arrangements that put individuals and populations in harm's way ... The arrangements are structural because they are embedded in the political and economic organisation of our social world; they are violent because they cause injury to people'. (Farmer et al., 2006:1686).

[9] Roll Back Malaria Partnership to End Malaria is a partnership which includes organisations for malaria endemic countries, bilateral and multilateral development partners, organisations from the private sector.

In the developed world we have now reached the societal position of exponential growth of productivity in the new modernity whereby hazards have grown unchecked above that previously known in the pursuit of material goods above what is genuinely needed (Beck, 2002, p.19). While in the developing world there remains distributive scarcity, the paradox is that while the developing world seeks social wealth from technological advancement, wealth in the developed world comes at the cost of risks. There is therefore huge global inequality. Beck (1992, p.20) claimed 'We do not yet live in a risk society, but we also no longer live only within the distribution conflicts of scarcity societies'. In other words, the developed world is now becoming distributors of wealth but the side effects are the hazardous risks of production and so within the modernisation process 'wealth distributing society is overlapped by the risk distributing society'. We no longer live only within scarcity societies struggling to gain subsidence through modernity. Since Beck (1992) wrote 'Risk Society', with the shrinking world through globalisation the gap will have potentially narrowed. Beck (1992, p.20) maintains that when the transition occurs and we truly live in a risk society 'there will be a real transformation of society, which will lead us out of the previous thoughts and action'. The critique of modernisation will then, either fade away becoming less globally destructive in force, or modernity will increase unabated, and though it must be said we currently live to a large extent in a risk society, it will be at that point that we will really live in a risk society.

It is to be remembered however that risk is associated with the future and is anticipation of hazards that are to come, they are not the hazards themselves. Though global risk highlights society's insecurities and vulnerabilities, it is dichotomous in nature because it also underpins society's responsibilities to their survival reminding humankind that it can put itself in jeopardy through its own behaviours and poor decisions of the past; its flip-side to destruction is to give hope for the future with greater chance of global alliance working for a common cause. Through cosmopolitanism with risk taking no heed of borders or having no disparity between wealthy and poor through its boomerang effect, it can be viewed as a double-edged sword. On the one hand it offers the potential for global catastrophe but on the other it offers responsibility and the chance for humankind to cooperate in their endeavour to survive.

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