Sustainability thought 171: How to state the structure of the Thomas Kuhn's paradigm evolution loop for the traditional market of Adam Smith when shifting to sustainability markets, to red markets, and to green markets under academic integrity?.

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Abstract

The Thomas Kuhn's paradigm evolution loop tells us that under academic integrity if there is academic consensus for paradigm change and shift away from any status quo model it happens. And this applies to any status quo paradigm. This paper focuses on the structure of the Thomas Kuhn's loop when the status quo model is the Adam Smith's traditional market model under extreme abnormality pressures and there is academic consensus to chance and shift paradigm under academic integrity. And this raises the question, how to state the structure of the Thomas Kuhn's paradigm evolution loop for the traditional market of Adam Smith when shifting to sustainability markets, to red markets, and to green markets under academic integrity?. What are the implications of this?. What is the structure of green market paradigm shift avoidance? Among the goals of this paper is to provide answers to these questions.

Key concepts

Scientific revolutions, status quo model, model abnormalities, paradigm crisis, paradigm death, academic consensus, paradigm shifts, academic integrity, willful academic blindness, scientific truth, academic facts, alternative academic facts, golden paradigm, flawed paradigm, new paradigms, paradigm evolution loop, social externalities, environmental externalities.

Introduction

a) The structure of scientific revolutions a la Thomas Kuhn under academic integrity

It has been pointed out recently(Muñoz 2022) that the structure of scientific revolutions a la Thomas Kuhn(Kuhn 1970) under academic integrity can be in general represented in a loop of 6 components as indicated in Figure 1 below:

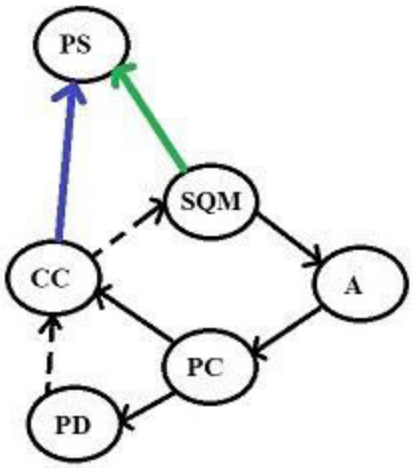

Figure 1 The Thomas Kuhn's revolution loop for shifting the status quo paradigm SQM to correct abnormality A under academic integrity

As it can be seen, the Kuhn's revolution loop in Figure 1 above is made up of six components, the status quo model SQM, the abnormalities A, the paradigm crisis PC, the paradigm death or threat PD, the consensus to change paradigm under academic integrity CC, and the paradigm shift PS.

The Kuhn's revolution loop in Figure 1 above works as follows: i) The status quo paradigm SQM produces abnormalities A as indicated by the arrow from SQM to A; ii) The accumulation of abnormalities A leads to a paradigm crisis PC as indicated by continuous black arrow from A to PC and leads to academic discourse between the status quo ideas and the new ideas on how to correct the abnormalities affecting the status quo paradigm once and for all; iii) When the accumulation of abnormalities become extreme they become a real threat of paradigm death PD as indicated by the continuous black arrow from PC to PD, and if nothing is done to correct the abnormalities the paradigm will die; iv) To avoid paradigm death PD the paradigm crisis PC leads an academic consensus to change paradigm CC accepting formally that the status quo paradigm SQM is not working; and accepting formally the new ideas supporting paradigm change, which is indicated by the continuous black arrow from PC to CC and by the broken black arrow from PD to CC; v) As the academic consensus for paradigm change CC now reached is supported by academic integrity as indicated by the blue arrow, then the paradigm shift PS actually takes place as indicated by blue arrow from CC to PS; and vi) The paradigm shift PS leads to the growth of scientific knowledge leaving the old knowledge base behind as indicated by the green arrow as resulting paradigm shift knowledge gaps needed to correct the abnormalities of the status quo paradigm are closed either through the new ideas or updated old ideas. The how paradigm shift knowledge gaps are created in general when paradigm shift takes place has been highlighted in detail recently(Muñoz 2020).

b) The traditional market of Adam Smith as the status quo model 1776 to 1987

It can be said that the traditional market of Adam Smith has been the status quo market model since 1776 when it was shared with the world by Adam Smith(Smith 1776), and this status quo ended formally when the Brundtland Commission called in 1987 (WCED 1987) for the need to move away from traditional market thinking as it was not working.

Since the traditional market is an economy dominant market(B), that assumes that social abnormalities(a) and environmental abnormalities(c) are external to the model, it can be stated analytically as follows:

1) TM = aBc

Expression 1 above simply says that in the traditional market model TM only the economy matters(B).

i) Golden model by assumption

Since in the traditional market model TM only the economy matters(B), then it is a golden paradigm by assumption so socio-environmental abnormalities(ac) can be dropped from the model as they are assumed not to exist or to be minimal as indicated in expression 2) below:

2) TM = B

Expression 2 tells us that it is assumed that the economy B can expand as needed without producing social and environmental abnormalities.

ii) Flawed model in reality

However, in practice it turned out to be that social abnormalities(a) and environmental abnormalities(c) do matter as they are the sustainability gaps(SG) affecting the sustainability of the traditional market as it expands, making the traditional market thinking a flawed model in reality, which can be indicated as follows:

3) TM = (SSG)B(ESG) where: SSG = a = social sustainability gap

ESG = c = environmental sustainability gap

Expression 3) above tells us that the traditional market model TM is affected by two sustainability gaps at the same time, the social sustainability gap(SSG) and the environmental sustainability gap(ESG).

c) The wide open sustainable development period 1987 to 2012

Formula 3 above indicates that the flaws affecting the traditional market model of Adam Smith since 1776 and that had accumulated extremely by 1987 , which the Brundtland Commission(WCED 1987) pointed out as problems of social and environmental responsibility were in fact social and environmental sustainability issues, not sustainable development issues,

yet instead of recommending the use of sustainability thinking to address sustainability issues the Commission sent us into a period of sustainable development as a way to move away from business as usual, a process that ended with addressing only the environmental responsibility problem in 2012(UNCSD 2012a; UNCSD 2012b).

d) The coming and going of green market thinking 2012 to 2022

On the way to the RIO +20 conference of 2012(UNCSD 2012a; UNCSD 2012b) there was a loud noise indicating formally that the way forward to go to address the environmental issues pointed out by the Brundtland Commission in 1987 was going green economy, green growth, and green markets. Yet soon after, a process of green market paradigm shift avoidance took place through using different forms of dwarf green market structures to manage, not fix, the environmental sustainability issue at hand, which continues today with the idea of Climate Change Economics to tackle climate change together(OECD 2022), that are market forms which fall outside perfect green market thinking. How approaches consistent with perfect green market thinking and outside perfect green market thinking can be contrasted and compared has been recently discussed(Muñoz 2019).

e) Linking the Thomas Kuhn's revolution loop and the need to move away from business as usual model of Adam Smith

Each type of paradigm shift under academic integrity can be framed using the Kuhn's revolution loop in Figure 1 above, including the different paradigm routes the traditional market can go through so it can be saved depending on the priorities set by decision markets on which abnormality to correct first. Hence, we can choose to correct both extreme social and extreme environmental abnormalities at the same time and shift to sustainability markets or we can choose to correct only the extreme social abnormality and shift to red markets or we can choose to correct only the extreme environmental abnormality and shift to green markets. For example, the idea of a perfect shift to green markets has been highlighted recently(Muñoz 2016). Once we know the structure of the paradigm shift we can see the structure of paradigm shift avoidance, including that of green market paradigm shift avoidance. And this raises the question, how to state the structure of the Thomas Kuhn's paradigm evolution loop for the traditional market of Adam Smith when shifting to sustainability markets, to red markets, and to green markets under academic integrity?. What are the implications of this?. What is the structure of green market paradigm shift avoidance? Among the goals of this paper is to provide answers to these questions.

Goals of this paper

a) To highlight the Thomas Kuhn's revolution loop for the traditional market when shifting to the sustainability market under academic integrity and its implications; b) To point out

the Thomas Kuhn's revolution loop for the traditional market when shifting to the red market under academic integrity and its implications; c) To stress the Thomas Kuhn's revolution loop for the traditional market when shifting to the green market under academic integrity and its implications; and d) To share the structure of the Thomas Kuhn's revolution loop when there is green market paradigm shift avoidance due to willful academic blindness.

Methodology

First the terminology used in this paper is shared. Second, the structure of the Kuhn's revolution loop when the traditional market shifts to the sustainability market under academic integrity is shared. Third, the structure of the Kuhn's revolution loop when the traditional market shifts to the red market under academic integrity is given. Fourth, the structure of the Kuhn's revolution loop when the traditional market shifts to the green market under academic integrity is summarized. Fifth, the structure of the Kuhn's revolution loop under green market paradigm shift avoidance is pointed out. And finally, some food for thoughts and relevant conclusions are listed.

Terminology

SQM = Status quo model

A = Abnormality

PC = Paradigm crisis

PD = Paradigm death

CC = Academic consensus to change paradigm

PS = Paradigm shift

DM = Dwarf model

GOM = Golden model

FLM = Flawed model

SFLM = Super flawed model

TM = Traditional market model

SM = Sustainability market model

RM = Red market model

GM = Green market model

a = Social abnormality

c = Environmental abnormality

ac = Socio-environmental abnormality

PCa = Paradigm crises due to social abnormality

Operational concepts and paradigm structures and Kuhn's loop transformations

A) Operational concepts

1) Science, the *world based on the scientific truth, this world falls if invalidated.*

2) Ideology, *the world based on the non-scientific truth, this world will tend to persist even if invalidated.*

3) The theory-practice general consistency principle, *the world where the theory of the model must match the practice.*

4) The different model general inconsistency principle, *the world where the theory and practice of different models are inconsistent with each other.*

5) Academic facts, the *science based truth.*

6) Alternative academic facts, *the non-science based truth.*

7) Academic blindness, *the inability to see academic facts due to the existence of knowledge gaps, paradigm shift based or otherwise.*

8) Willful academic blindness, *the willingness to ignore academic facts and consensus.*

9) Sustainability, the world where the interplay of sustainability theory and sustainability practice is aimed at fixing or correcting embedded externality problems.

10) Sustainable development, the world where the interplay of sustainable development theory and sustainable development practice is aimed at patching or managing embedded externality problems.

11) Academic integrity, the duty to respect and defend academic facts and consensus.

12) Golden paradigm, one that does not creates abnormalities.

13) Flawed paradigm, one that creates abnormalities.

14) Kuhn's loop, the science based mechanism that leads to paradigm shift through abnormality correction.

B) Paradigm structures

1) A golden paradigm

If we have a dominant paradigm R and it is a golden paradigm GOM, then it produces no externalities or no abnormalities A

i) GOM = R

As it can be seen in expression i) above the golden model GOM does not produce abnormalities.

2) A flawed paradigm

If we have a dominant paradigm R and it is a flawed paradigm FLM, then it produces "n" externalities or abnormalities A so as A1,A2,….

ii) FLM = R(A1, A2,….An)

As it can be appreciated in expression ii) above the flawed model FLM produces "n" abnormalities.

C) The Thomas Kuhn's transformation loop(TKTL) under academic integrity

1) Impact on the golden paradigm

If we subject a golden paradigm GOM = R to the Thomas Kuhn's transformation loop(TKTL), the process will have no impact on it as it has no abnormalities A to correct, golden paradigm GOM remains a golden paradigm GOM

iii) TKTL(GOM) = TKTL(R) = R = GOM

The expression iii) above tells us that the golden model displays TKTL loop neutrality as it has no abnormalities to remove.

2) Impact on the flawed paradigm

If we subject a flawed paradigm FLM = **R(A1,A2,….An)** to the Thomas Kuhn's transformation loop(TKTL), the loop process will be active until all abnormalities are corrected and a golden paradigm GOM arises

iv) TKTL(FLM) = TKTL[R(A1,A2,….An) -------→R = GOM

The expression iv) above tells us that the TKTL loop process transforms flawed dominant paradigms FLM in the end into golden paradigms GOM by correcting the abnormalities A1…..An affecting them and shifting them in the process.

D) Relevant market structures

If we have the following: a = social abnormality, c = environmental abnormality, A = dominant society, C = dominant environment, and B = the dominant economy, then the structure of relevant markets can be stated as indicated below:

1) The traditional market as a golden model

i) TM = B

Under externality neutrality assumptions the traditional market TM in section i) above is a golden paradigm, it produces no abnormalities.

2) The traditional market under social abnormalities(a)

ii) TM = aB

Under no social externality neutrality assumptions, the traditional market TM in section ii) above produces social abnormalities "a". It is a flawed paradigm as it has social abnormalities to correct.

3) The traditional market under environmental abnormalities(c)

iii) TM = Bc

Under no environmental externality neutrality assumptions, the traditional market TM in section iii) above produces environmental abnormalities "c". It is a flawed paradigm as it has environmental externalities to correct.

4) The traditional market under socio-environmental abnormalities(ac)

iv) TM = aBc

Under no socio-environmental externality neutrality assumptions, the traditional market TM in section iv) above produces socio-environmental abnormalities "ac". It is a flawed paradigm as it has social and environmental externalities to correct.

5) The red market under environmental abnormalities(c)

v) RM = ABc

Under no environmental externality assumptions, the red market RM in section v) above produces environmental abnormalities. It is a flawed paradigm as it has environmental externalities to correct. Notice that in the red market RM, both society(A) and economy(B) are in dominant form.

6) The green market under social abnormalities(a)

vi) GM = aBC

Under no social externality assumptions, the green market GM in section vi) above produces social abnormalities. It is a flawed paradigm as it has social externalities to correct. Notice that in the green market GM, both the economy(B) and the environment(C) are in dominant form.

7) The sustainability market has no abnormalities

vii) SM = ABC

The sustainability market SM in section vii) above produces no abnormalities as all components are in dominant form since all components are now endogenous to the model. It is a golden paradigm as it has no abnormalities to correct.

The Thomas Kuhn's revolution loop for the traditional market when shifting to the sustainability market under academic integrity

If the status quo paradigm SQM in Figure 1 above is the traditional market model of Adam Smith(TM) so that SQM = TM and the decision is made to correct both the social and environmental issues associated with doing business at the same time so that A = ac, then the traditional market(TM) will shift towards the sustainability market(SM), as indicated by the blue arrow in Figure 2 below:

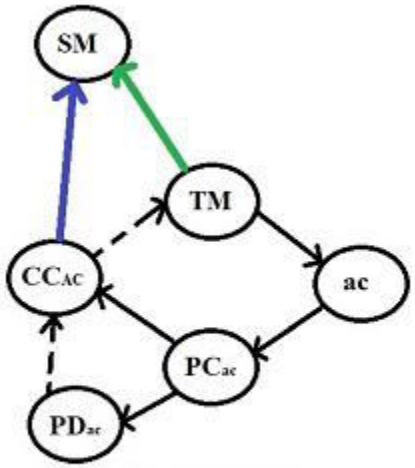

Figure 2 The Thomas Kuhn's revolution loop for the shift from traditional markets TM to sustainability markets SM under academic integrity

The Kuhn's revolution loop for the shift to sustainability markets SM in Figure 2 above works as follows: i) The traditional market TM produces socio-environmental abnormalities "ac" as indicated by the arrow from TM to "ac"; ii) The accumulation of socio-environmental abnormalities "ac" leads to a socio-environmental paradigm crisis PC_{ac} as indicated by continuous black arrow from "ac" to PC_{ac}, which drives academic discourse between the traditional market ideas and the new ideas on how to correct the socio-environmental abnormalities affecting the traditional market once and for all; iii) When the accumulation of socio-environmental abnormalities become extreme they become a real threat of paradigm death PD_{ac} for the traditional market as indicated by the continuous black arrow from PC_{ac} to PD_{ac}, and

if nothing is done to correct the socio-environmental abnormalities the traditional market paradigm will die; iv) To avoid paradigm death PD_{ac} due to extreme socio-environmental abnormalities the paradigm crisis PCac facing the traditional market leads an academic consensus to change paradigm CC_{AC} accepting formally that the traditional market TM is not working and accepting formally too the new ideas supporting paradigm change to correct the socio-environmental abnormality affecting the traditional market TM, which is indicated by the continuous black arrow from PC_{ac} to CC_{AC} and by the broken black arrow from PD_{ac} to CC_{AC}; v) As the academic consensus for paradigm change CC_{AC} that has been reached is supported by academic integrity as indicated by the blue arrow, then the paradigm shift to sustainability markets SM actually takes place as indicated by blue arrow from CC_{AC} to SM; and vi) The paradigm shift to sustainability markets SM leads to the growth of scientific knowledge on sustainability markets leaving the old knowledge base of the traditional market model TM behind as indicated by the green arrow as resulting sustainability market paradigm shift knowledge gaps needed to correct the socio-environmental abnormalities of the traditional market are closed either through the new ideas or updated old ideas.

Implications

1) When the accumulation of socio-environmental externalities become too extreme, to save capitalism TM there will be academic consensus under academic integrity to internalize socio-environmental abnormalities and shift the traditional market model of Adam Smith towards the sustainability market(TM = aBc---→ SM = ABC), a socially and environmentally friendly market; and 2) The shift to sustainability markets SM leads to the growth of scientific knowledge on sustainability market thinking, sustainability market based micro-economics and macroeconomics as pillars perfect sustainability market theory.

The Thomas Kuhn's revolution loop for the traditional market when shifting to the red market under academic integrity

If the status quo paradigm SQM in Figure 1 above is the traditional market model of Adam Smith(TM) so that SQM = TM and the decision is made to correct only the social issues associated with doing business so that A = a, then the traditional market(TM) will shift towards the red market(RM), as indicated by the blue arrow in Figure 3 below:

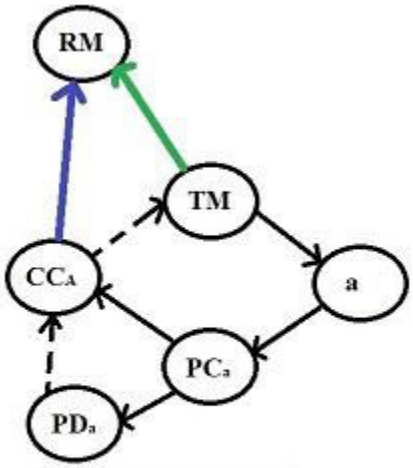

Figure 3 The Thomas Kuhn's revolution loop for the shift from tradtional markets TM to red markets RM under academic integrity

The Kuhn's revolution loop for the shift to red markets RM in Figure 3 above works as follows: i) The traditional market TM produces social abnormalities "a" as indicated by the arrow from TM to "a"; ii) The accumulation of social abnormalities "a" leads to a social paradigm crisis PC_a as indicated by continuous black arrow from "a" to PC_a. which brings academic discourse between the traditional market ideas and the new ideas on how to correct the social abnormalities affecting the traditional market TM once and for all; iii) When the accumulation of social abnormalities become extreme they become a real threat of paradigm death PD_a for the traditional market as indicated by the continuous black arrow from PC_a to PD_a, and if nothing is done to correct the social abnormalities the traditional market paradigm will die; iv) To avoid paradigm death PD_a due to extreme social abnormalities the paradigm crisis PCa facing the traditional market leads an academic consensus to change paradigm CC_A accepting formally that the traditional market TM is not working and accepting formally also the new ideas supporting paradigm change to correct the social abnormality affecting the traditional market TM, which is indicated by the continuous black arrow from PC_a to CC_A and by the broken black arrow from PD_a to CC_A; v) As the academic consensus for paradigm change CC_A that has been reached is supported by academic integrity as indicated by the blue arrow, then the paradigm shift to red markets RM actually takes place as indicated by blue arrow from CC_A to RM; and vi) The paradigm shift to red markets RM leads to the growth of scientific knowledge on red markets leaving the old knowledge base of the traditional market model TM behind as indicated by the green arrow as resulting red market paradigm shift knowledge gaps needed to correct the social abnormalities of the traditional market are closed either through the new ideas or updated old ideas.

Implications

1) When the accumulation of social externalities become too extreme, to save capitalism TM there will be academic consensus under academic integrity to internalize social

abnormalities and shift the traditional market model of Adam Smith towards a red market(TM = aB----→ RM = AB), a socially friendly market; and 2) The shift to red markets RM leads to the growth of scientific knowledge on red market thinking, red market based micro-economics and macroeconomics as pillars perfect red market theory.

The Thomas Kuhn's revolution loop for the traditional market when shifting to the green market under academic integrity

If the status quo paradigm SQM in Figure 1 above is the traditional market model of Adam Smith(TM) so that SQM = TM and the decision is made to correct only the environmental issues associated with doing business so that A = c, then the traditional market(TM) will shift towards the green market(GM), as indicated by the blue arrow in Figure 4 below:

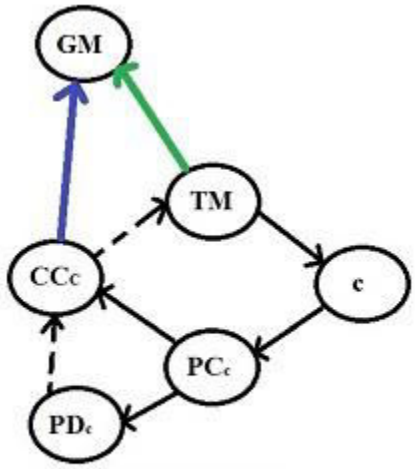

Figure 4 The Thomas Kuhn's revolution loop for the shift from traditional markets TM to green markets GM under academic integrity

The Kuhn's revolution loop for the shift to green markets GM in Figure 4 above works as follows: i) The traditional market TM produces environmental abnormalities "c" as indicated by the arrow from TM to "c"; ii) The accumulation of environmental abnormalities "c" leads to an environmental paradigm crisis PC_c as indicated by continuous black arrow from "c" to PC_c and to academic discourse between the traditional market ideas and the new ideas on how to correct the environmental abnormalities affecting the traditional market TM once and for all; iii) When the accumulation of environmental abnormalities become extreme they become a real threat of paradigm death PD_c for the traditional market as indicated by the continuous black arrow from PC_c to PD_c, and if nothing is done to correct the environmental abnormalities the paradigm will die; iv) To avoid paradigm death PD_c due to extreme environmental abnormalities the paradigm crisis PCc facing the traditional market leads an academic consensus to change paradigm CC_C

accepting formally that the traditional market TM is not working and accepting formally also the new ideas supporting paradigm change to correct the environmental abnormality affecting the traditional market, which is indicated by the continuous black arrow from PC_c to CC_C and by the broken black arrow from PD_c to CC_C; v) As the academic consensus for paradigm change CC_C that has been reached is supported by academic integrity as indicated by the blue arrow, then the paradigm shift to green markets GM actually takes place as indicated by blue arrow from CC_C to GM; and vi) The paradigm shift to green markets GM leads to the growth of scientific knowledge on green markets leaving the old knowledge base of the traditional market model TM behind as indicated by the green arrow as resulting green market paradigm shift knowledge gaps needed to correct the environmental abnormalities of the traditional market are closed either through the new ideas or updated old ideas.

Implications

1) When the accumulation of environmental externalities become too extreme, to save capitalism TM there will be academic consensus under academic integrity to internalize environmental abnormalities and shift the traditional market model of Adam Smith towards a green market(TM = Bc----→ GM = BC), an environmentally friendly market; and 2) The shift to green markets GM leads to the growth of scientific knowledge on green market thinking, green market based micro-economics and macroeconomics as pillars perfect green market theory.

The structure of the Thomas Kuhn's revolution loop when there is green market paradigm shift avoidance due to willful academic blindness.

When academic consensus to change paradigm CC has been reached under academic integrity we have paradigm shift compliance as indicated by blue arrows as shown in Figure 1 above in the general paradigm shift PS loop, in Figure 2 above in the sustainability market paradigm shift SM loop , in Figure 3 above in the red market paradigm shift RM loop, and in Figure 4 above in the green market paradigm shift GM loop. However, under willful academic blindness it is possible to walk away from the academic consensus to change paradigm already reached and go the way of paradigm shift avoidance, as indicated in Figure 5 below in the case of green market paradigm shift avoidance:

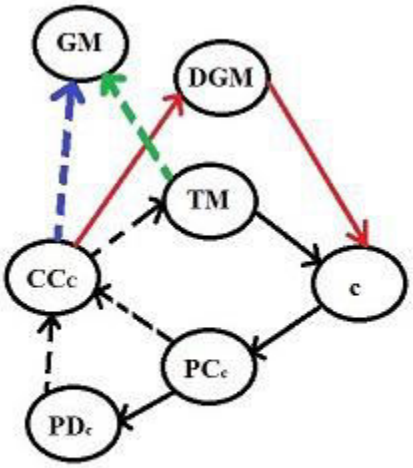

Figure 5 The Thomas Kuhn's revolution loop structure under green market paradigm shift avoidance

Figure 5 above shows the structure of green market paradigm shift avoidance where despite the academic consensus CC_C to shift to green markets, the system goes dwarf green market DGM and it is aimed at managing the environmental abnormality "c" still is being produced by the previous status quo model TM as indicated by the continuous black arrow from TM to "c". Figure 5 also shows that under dwarf green markets the extreme environmental crisis PC_c if nothing is done leads straight to paradigm death PD_c as indicated by the continuous arrows from DGM to "c" to PC_c to PD_c

Implications

1) Under willful academic blindness the Thomas Kuhn's revolution loop breaks and goes the way of dwarf markets; 2) In the case of the green markets, willful academic blindness leads to green market paradigm shift avoidance and to the move to dwarf green markets DGM; 3) Only the failure of dwarf green markets in the long term pointing to sure paradigm death due to extreme environmental unsustainability if doing nothing would start the process back towards a shift to green markets; and 4) The break of the Kuhn's revolution loop blocks the shift to green markets, block the growth of green market knowledge as green market paradigm shift knowledge gaps are not addressed, and blocks the transition process from pollution based economies to clean economies, making markets, countries, more dependent on non-renewable sources of energy as time passes as there are no incentives to reduce pollution while making money, only incentives to continue polluting under management while making money exist.

Food for thoughts

1) Does science becomes ideology at the point where the scientific truth is willfully ignored by scientists in order to break away from academic consensus and take different path? I think yes, what do you think?; 2) Do dwarf green markets break the path of orderly transition to the clean economy? I think yes, what do you think?; and 3) Does presenting or defining or implementing imperfect dwarf green market ideas as perfect green market ideas requires alternative academic facts? I think yes, what do you think?

Conclusions

First, it was shown that when there is academic consensus for paradigm change to sustainability markets under academic integrity a shift to sustainability markets takes place. Second, it was indicated that when there is academic consensus for paradigm change to red markets under academic integrity a shift to red markets takes place. Third, it was stressed that when there is academic consensus for paradigm change to green markets under academic integrity a shift to green markets takes place. And fourth, it was pointed out that when there is academic blindness, the Thomas Kuhn's revolution loops breaks leading to paradigm shift avoidance and to dwarf markets like the dwarf green market.

In general, it was highlighted that under academic integrity academic consensus for paradigm change leads to actual paradigm shift, be it to sustainability markets or to red markets or to green markets; and it was detailed that when there is willful academic blindness the Kuhn's revolution loop cracks and leads to paradigm shift avoidance, like the 2012 green market paradigm shift avoidance case shows. The coming of dwarf green markets blocks the orderly transition from the full pollution based economy to the clean economy through perfect green market dynamics.

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