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Evolving Development Paradigm Choices: Are We Moving Towards Sustainability Through Development Waves?

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Abstract

Up to 2012 the world was living under two competing dominant development paradigms, red socialism and bare capitalism, which then collapsed and shifted towards competing shared dominance development paradigms, red capitalism and green capitalism respectively. The red socialism model collapsed in 1991 when Karl Marx's world ended with the fall of the Soviet Union culminating with the birth of red capitalism. There was then a shift from a society only model to a win-win society and economy model in all previously socialist countries, including China. From 1987 to 2012 the traditional market went through a fixing process culminating with the 2012 birth of green capitalism. There was then a shift from an economy only model to a win-win environment and economy model in all old capitalist countries. Notice that in both cases paradigms evolved from full dominance structures(deep paradigms) to partially sharing dominance structures(partial partnership based paradigms).

And if in the future red capitalism closes its environmental sustainability gap and/or if green capitalism closes its social sustainability gap either due to internal paradigm dynamics or cold war pressures there will be a shift towards sustainability. In other words, there will be a shift from partially sharing dominance paradigms(partial partnership models) to fully sharing dominance paradigms(full partnership models) when sustainability gaps are closed. And this raises the questions, Are we moving towards sustainability through development waves that are more and more inclusive each time? Are these development waves connected to evolving rational choice and preference aggregation structures? Are sustainability and sustainability markets the last development wave?. Among the goals of this paper is to provide answers to these questions.

Key words

Paradigm evolution, sustainability, development waves, red market, green market, red capitalism, green capitalism, red socialism, bare capitalism, old cold war, future cold war, sustainability market

Introduction

It seems that paradigm evolution is taking place step by step; and each step is getting us closer to sustainability(Muñoz 2015). We seem to be going from deep development paradigms to partial partnership based paradigms; and it seems the only remaining step in this paradigm evolution process is a shift towards a full partnership paradigm or sustainability market. Below the different development worlds are described as they have happened in the history of development paradigms to provide a sense of paradigm evolution gravitating towards sustainability markets.

a) The world of competing deep paradigms

Until 2012 the world have been living under two competing deep development paradigm models, the red socialism or society only model of Karl Marx and bare capitalism or the economy only model of Adam Smith. Karl Marx's model collapsed in 1991 with the fall of the Soviet Union and Adam Smith's model collapsed in 2012 Rio + 20 (Muñoz 2016a). And therefore, the world of deep development paradigms can be considered to be the first development wave, which is now a thing of the past.

b) The world of partially sharing paradigms

Today the world is living under two competing partnership based paradigms, red capitalism in former socialist countries and green capitalism in old capitalist countries. Red socialism shifted towards socially friendly capitalism in 1991 when former socialist countries closed their economic sustainability gap and bare capitalism shifted towards green capitalism in 2012 when it closed its environmental sustainability gap(Muñoz 2016b); and this shift to green markets(UNCSD 2012a; 2012b) is a partial fulfillment of the fixing request made by the Bruntland commission in 1987(WCED 1987) as social sustainability gaps were left untouched. When paradigm shifts take place a paradigm shift knowledge gap is created as the old paradigm knowledge based is left behind, so there is today a red market knowledge gap and a green market knowledge gap. Muñoz(2016c) stressed in detail the green market knowledge gap created when the paradigm shifted from the traditional market to green markets. Yet without the appropriate green micro-economic and green macro-economic tools the world is going green a la low carbon based development fast. For example, the Organisation for Economic Cooperation and development is promoting green bonds(OECD 2015a), green investment banks(OECD

2015b), and supporting the agenda of green markets and green growth(OECD 2015c), even whole continents are going green(UNECA 2016).

In other words, a shift from a society only model to a win-win society and economy model took place in 1991 in all previously socialist countries, including China; and a shift from an economy only model to a win-win environment and economy model took place in 2012 all old capitalist countries when red socialism and bare capitalism died, merged, and shifted(Muñoz 2016d). Notice that in both cases paradigms evolved from full dominance structures(deep paradigms) to partially sharing dominance structures(partial partnership based paradigms). So today there are two competing partnership based capitalist systems, red capitalism and green capitalism. And therefore, the world of partial partnership based paradigms such as the red market and the green market can be considered to be the second development wave, the development wave under which the world is living right now.

c) Paradigm shifts and sustainability gaps

Muñoz(2016e) indicated recently about paradigm dynamics and paradigm death and shifts the following: a) that there is an environmental sustainability gap(ESG) affecting red capitalism as red markets assume environmental externality neutrality; b) that there is a social sustainability gap(SSG) affecting green capitalism as green markets assumed social externality neutrality; and c) that according to paradigm death and shift expectations when sustainability gaps tend to zero due to constant system expansion and constant accumulation of sustainability deficits there is paradigm death and a shift towards a more sustainable structure as sustainability gaps are closed. This is summarized below case by case:

i) The case of red capitalism

As red capitalism(R) is a partnership between society(A) and the economy(B) and the environment(c) is there to meet the needs of the partnership it can be stated as follows:

R = ABc

If we make ESG = c, then we have the following:

R = ABc = AB(ESG)

The expression above indicates that there is an environmental sustainability gap(ESG) affecting the red capitalism model(R); and if internal dynamics or external dynamics lead to the closing of this ESG gap, red capitalism(R) would shift towards sustainability based capitalism or sustainability markets(S) as socio-economic and environmental win-win situations are found, which can be indicated as follows:

R = ABc = AB(ESG = c----→C)------→ABC = S since closing ESG = c--→ C

Therefore, if the red market(R) closes its environmental sustainability gap(ESG = c----→C) it will shift towards sustainability markets(S).

ii)The case of Green capitalism

As green capitalism(GM) is a partnership between the economy(B) and the environment(C) and society(a) is there to meet the needs of the partnership it can be stated as follows:

GM = aBC

If we make SSG = a, then we have the following:

GM = aBC = (SSG)BC

The expression above indicates that there is a social sustainability gap(SSG) affecting the green capitalism model(GM); and if internal dynamics or external dynamics lead to the closing of this SSG gap, green capitalism(GM) would shift towards sustainability based capitalism or sustainability markets(S), which can be indicated as follows:

GM = aBC = (SSG = a---→A)BC------→ABC = S since closing SSG = a----→A

Hence, if the green market(GM) closes its social sustainability gap(SSG) it will shift towards sustainability markets(S).

iii) The case of the future cold war

Since the two dominant and competing partial partnership based development systems of today are the ones described above we can state the structure of the future cold war(FCW) as a clash between red capitalism/red markets(R); and green capitalism/green markets(GM), which can be expressed as shown below:

FCW = R.GM = (ABc)(aBC) = (Aa)(BB)(cC) = (Aa)B(cC)

If we make SSG = Aa and ESG = cC

FCW = R.GM = (SSG)(B)(ESG)

The expression above indicates that the future cold war(FCW) will be a clash between the social sustainability gap(SSG) affecting green capitalism(GM) and the environmental sustainability gap(ESG) affecting red capitalism(R). In other words, green capitalism can make a green case against red capitalism; and red capitalism can make a social case against green capitalism. And this creates room for two different types of cold war games: a) the fight until the end or wait until you die and shift game; and b) the proactive or find win-win situations to close the sustainability gap and shift game. Notice that whoever loses the future cold war(FCW) or shifts first towards sustainability(S) will put pressure on the other paradigm to shift towards

sustainability(S) too as for both sustainability markets(S) would be a more stable position to be in.

However, today nobody appears to be worried about sustainability gaps as the world's attention now, especially in old capitalist countries, appears to be on setting up green economies or green markets (UNDESA 2012), on how to use the green market world as a way of dealing with complex environmental issues such as climate change(WB 2016), tracking progress towards green growth(OECD 2015d) and on encouraging the financial sector to invest in environmentally friendly ways(UNEP 2016). Muñoz(2016f) just pointed out what the structure of the perfect green market would be if the traditional market price is corrected to internalize environmental issues.

d) A world of fully sharing paradigms

Therefore, consistent with the above if red capitalism(R) closes its environmental sustainability gap(ESG) and/or if green capitalism(GM) closes its social sustainability gap(SSG) due to internal paradigm dynamics or cold war pressures there will be a shift towards sustainability(S), a world of fully sharing dominance paradigms. In other words, there will be a shift from partially sharing dominance paradigms(partial partnership models) to fully sharing dominance paradigms(full partnership models).

Interest in sustainability issues and markets is expected to increase as sustainability awareness increases. For example now sustainability ideas are accepted as a marketing tool(Charter et al 2002; Imrrel 2003), as an action plans(CV 2012); as a reporting tool(BP 2014; Volkswagen 2014), and as the concept that helps businesses manage their triple bottom line, economic, social, and environmental aspects(FTL 2016), but not much is written about sustainability as a market paradigm or about sustainability markets and theory. Muñoz(2016g) just highlighted what the structure of the perfect sustainability market would be if the green market price is corrected to internalize social issues.

Please notice that all possible paradigm shifts for the partial partnership based models indicated above be it the green market paradigm or the red market paradigm appear to lead only towards a shift to sustainability(S) if sustainability gaps are closed. Sustainability markets(S) is the common destination for all partnership based models to shift if sustainability gaps are closed. And this raises the questions, Are we moving towards sustainability through development waves that are more and more inclusive each time? Are these development waves connected to evolving rational choice and preference aggregation structures?. Are sustainability and sustainability markets the last development wave?. Among the goals of this paper is to provide answers to these questions.

Goals of this paper

a) To share a development framework that can be used to highlight paradigm evolution as a chain of development waves moving towards more stable positions each time; b) To link the evolution of development choices to those development waves and to the parallel evolution of preference aggregation structures; and c) to use the above to point out that sustainability markets appear to be the last development wave in that evolution.

Methodology

First, the terminology used in this paper is provided. Second, some merging rules and operational concepts and models are listed. Third, the idea of development waves is introduced highlighting some important aspects for each wave. Fourth, the evolution of preference aggregation structures is linked to the evolution of development waves to highlight their parallel evolution so the theory-practice consistency principle holds in each wave. Fifth, the different development waves are linked to associated paradigm death, mergers and shifts. And finally, some food for thoughts and relevant conclusions are shared.

Terminology

The terminology used in this paper is listed in table 1 below:

Table 1

A = Active social system	a) Passive social system
B = Active economic system	b) Passive economic system
C = Active environmental system	c) Passive environmental system
T = Adam Smith's model	S = Sustainability market
K = Karl Marx's model	SG = Sustainability gap
SSG = Social sustainability gap	ESG = Environmental sustainability gap
PMR = Paradigm merging rules	SEM = Socio-economic model

GM = Green market R = Red market

OCW = Old cold war FCW = Future cold war

W = The ideal world model I_i = individual "i"

Merging rules, operational concepts and models

i) Paradigm merging rules(PMR)

If "A" , "B" and "C" are dominant characteristics; and "a", "b" and "c" are their dominated or passive counter parts, the following is expected:

a) Merging under dominant-dominant interactions

Under these conditions, dominant or active state prevails as indicated:

(AA) → A (BB) → B (CC) → C (AA) (BB)(CC) = (ABC)(ABC) → ABC

b) Merging under dominated-dominated interactions

Under these conditions, the dominated or passive form prevails as shown:

(aa) → a (bb) → b (cc) → c (aa) (bb)(cc) = (abc)(abc) → abc

c) Merging under dominant-dominated interactions and win-win solutions

Under these conditions, the dominant or active system prevails as the system merge as shown below:

(Aa) → A (bB) → B (cC) → C (Aa) (bB(cC) = (ABC)(abc) → ABC

d) Merging under dominant-dominated interactions and no win-win solutions

Under these conditions, the dominated or passive system prevails and the system collapses as shown below:

(Aa) → a (bB) → b (Cc) → c (Aa) (bB)(Cc) = (ABC)(abc) → abc

e) Neutrality assumption

When we assume component externality neutrality the following is true as passive components can be dropped as they are not important:

Abc = A **aBc = B** **abC = C**

AbC = AC **aBC = BC** **ABc = AB**

e) No neutrality assumption

When we assume that there is no component externality neutrality the following is true as passive components cannot be dropped as they are the sustainability gaps affecting the stability of that model:

Abc = Abc **aBc = aBc** **abC = abC**

AbC = AbC **aBC = aBC** **ABc = ABc**

ii) Operational concepts

To present the views in this paper and link them later to paradigm waves and to parallel preference structure evolution we will use here the well-known terms Society(A), Economy(B) and Environment(C) as development choices that can exist in independent form, partially mixed or partial codependent form, and fully mixed or full codependent form:

a) Types of development choices

1) Fully independent development choices, when we have individual development choices unrelated to each other or pure choices such as society only(A), economy only(B), and environment only(C). In this world only fully independent development choices exist so the set = {A, B, C}. This is the world of the Arrow Impossibility theory and theorem.

2) Partially codependent development choices, when we have mixed/paired development choices such as socio-economy(AB), socio-environment(AC), and eco-economy(BC). In this universe only codependent development choices exist so the set = {AB, AC, BC}. This is outside the normal world of the Arrow Impossibility theory and theorem.

3) Fully codependent development choices, when all development choices are mixed together such as the socio-economy-environment(ABC) model. In this paradigm only fully codependent development choices exist so the set = {ABC}. This is outside the world of the Arrow Impossibility theory and theorem.

b) Types of development system structures

1) Fully independent development systems, they are deep development paradigm systems such as the deep social model(K = Abc), the deep economic model(T = aBc), the deep ecological model(EC= abC). In deep systems only independent development choices work. Therefore, in theory deep social systems(K) work under independent social development choices, deep economic systems(T) work under independent economic development choices, and deep environmental systems(EC) work under independent environmental development choices.

In practice we know that deep social systems(K) were not based on independent social development choices, but on dictatorial social choices; and we know that deep environmental systems(EC) have never existed in practice, at least to my knowledge. Therefore, the theory of fully independent development systems is important here to link it to paradigm evolution or shift from deep development systems towards partial partnership based development systems.

2) Partially codependent development systems, they are development systems based on partnership thinking such as the socio-economic market or red market model((R= ABc), the eco-economic or green market model(GM = aBC), and the socio-ecological model(SEC =AbC). In partnership based development paradigms only partially codependent development choices work. Therefore, in theory the socio-economic market(R) works only under partially codependent socio-economic development choices, the green market(GM) works only under partially codependent eco-economic development choices, and the socio-ecological model(SEC) works only under partially codependent socio-ecological development choices.

Today it seems that only the socio-economic partnership or red market(R) like the one in China and in the former soviet states; and the eco-economic or green market partnership(GM) like the green market in old capitalist countries are viable examples of partial partnership based models, no example seems to exist in practice at least to my knowledge of socio-environmental partnership(SEC) that would be viable as they assume economic externality neutrality. Hence, the theory of partially codependent development systems is important here to link it to paradigm evolution or shift from partial partnership based development systems towards full partnership based systems.

3) Fully codependent development systems, they are development systems based on full inclusion such as the sustainability market model(S = ABC). This market does not exist yet, but it is in our paradigm shift route. Therefore, the theory of fully codependent development systems is important here to highlight that sustainability markets(S = ABC) are the final and common destination of the two currently relevant partnership based development paradigms as they close their respective sustainability gaps.

c) Linking rationality, development choices and development system structures

1) Rational independent decision makers, they are created when we put fully independent development choices together with fully independent development systems. Therefore, in theory there is a rational independent social decision maker in deep social systems or red man; there is a rational independent economic decision maker in deep economic systems or economic man, and there is a rational independent environmental decision maker in deep ecological paradigms or the green man.

In practice we know the red man was not an independent man, that the green man has never existed, and that the only rational independent decision maker that we know of is the economic man. See that independent development choices(independent development choice structure such as {A, B, C}) go with independent deep systems(independent development system structure such as K = Abc, EC = abC and T = aBc) to keep intact the theory-practice consistency principle. The use of any type of not fully independent development choice in any of these deep systems would violate the theory-practice consistency principle.

2) Rational partially codependent decision makers, they are created when we put partially codependent development choices together with partially codependent development systems. Therefore, in theory there is a rational partially codependent decision maker in socio-economic systems(R), the red economic man; there is a rational partially codependent decision maker in eco-economic systems(GM), the green economic man, and there is a rational partial codependent decision maker in socio-ecological paradigms(SEC), the green social man. In practice we know that the red economic man rules in red markets, that the green economic man rules in green markets, and that the green social man has never existed at least to my knowledge.

It is important here to highlight that partially codependent development choices(partial codependent development choice structure such as {AB, AC, BC}) go with partially codependent systems(partially codependent development system structure such as R = ABc, SEC = AbC and GM = aBC) to keep intact the theory-practice consistency principle. The use of any type of not partially codependent development choice in any of these partially codependent development systems would violate the theory-practice consistency principle.

3) Rational fully codependent decision makers, they are created when we put fully codependent development choices together with fully codependent development systems. Under the sustainability market(S) we have the rational fully codependent decision maker now known as the sustainability man, who incorporates fully codependent sets of development choices such as {ABC} in his decision making process.

Notice that fully codependent development choices(fully codependent development choice structure such as {ABC)) go with fully codependent development systems(fully codependent system structure such as S = ABC) to keep intact the theory-practice consistency principle. The use of any type of none fully codependent development choice in fully codependent development systems would violate the theory-practice consistency principle.

iii) Operational models

a) The individual development choice model(I_i)

If there are three different development choices, society(A), economy(B) and environment(C), then an individual development choice model(Ii) can be stated as follows:

1) $I_i = A + B + C$

The model above says that individual Ii can choose any independent development choice(A, B, or C) or any partially codependent development choice(AB, AC or BC) or a fully codependent development choice(ABC). In other words, individual Ii has the following 7 different development choices as shown in Table 2 below:

Table 2

Choice	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Individual Ii	**A**	**B**	**C**	**AB**	**AC**	**BC**	**ABC**

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b) The ideal development world(W)

Let's assume now that we live in a world(W) where the development choices society(A), economy(B), and environment(C) can be found in pure forms({A, B, C}), in partially mixed forms({AB, AC, BC}) and in fully mixed forms({ABC}) at the same time. This ideal world can be expressed as shown below:

2) W = A + B + C + AB + AC + BC + ABC

In the ideal development world(W) above all those development choices available to individual Ii are available to all of us at the same time and each of us could express individual development preferences, which could be aggregated to determine different types of social development preferences or welfare functions.

c) Preference aggregation model

For aggregating preferences across independent, partially codependent and fully codependent development choices let's assume we have two individuals, I_1 and I_2 and their preferences can be arranged as indicated in Table 3 below:

Table 3

$I_1 \setminus I_2$	A	B	C	AB	AC	BC	ABC
A	**A**	**AB**	**AC**	**AB**	**AC**	**ABC**	**ABC**
B	**AB**	**B**	**BC**	**AB**	**ABC**	**ABC**	**ABC**
C	**AC**	**BC**	**C**	**ABC**	**AC**	**BC**	**ABC**
AB	**AB**	**AB**	**ABC**	**AB**	**ABC**	**ABC**	**ABC**
AC	**AC**	**ABC**	**AC**	**ABC**	**AC**	**ABC**	**ABC**
BC	**ABC**	**BC**	**BC**	**ABC**	**ABC**	**BC**	**ABC**
ABC	**ABC**	**ABC**	**ABC**	**ABC**	**ABC**	**ABC**	**ABC**

Table 3 above combines the choices of individual I_1 and I_2 and it shows that we can only aggregate preference choices along the diagonal when both individuals make the same independent choice, the same partially codependent choice or the same fully codependent choice as when their development choices do not match they cannot be aggregated as non matching choices cancel themselves out as they are not available within that paradigm; and therefore only matching development choices can be added up.

Therefore, the yellow diagonal in Table 3 above is the line of development preference aggregation to determine welfare functions, singular, partially non-singular, and fully non-singular welfare functions depending of the type of paradigm in which the aggregation process is taking place. In other words, deep development models require singular or independent development choice aggregation, partially codependent development models require partially non-singular or partially codependent development choice aggregation, and fully codependent development models require fully nonsingular or fully codependent development choice aggregation. Notice that the structure of the table above would be the same in terms of aggregation implications if instead of individual I_1 and I_2 we had two groups of people G_1 and G_2.

d) The general development model(D)

Let's assume now the following: i) that we have population of "n" individuals(Ii) in the world, where i = 1, 2, 3…n; ii) that some individuals(I_i) express deep development

preferences(A, B or C), other individuals(I_i) express partially codependent development preferences(AB, AC or BC), and others individuals(I_i) express full codependent development preferences(ABC); and iii) therefore, all their development preferences can be aggregated in 7 different groups as shown in model D below:

$$\text{3)}\quad D = \sum_{h=1}^{q} IA + \sum_{j=1}^{r} IB + \sum_{k=1}^{s} IC + \sum_{l=1}^{t} IAB + \sum_{m=1}^{u} IAC + \sum_{o=1}^{v} IBC + \sum_{p=1}^{x} IABC$$

Where $n = q + r + s + t + u + v + x$

The general development model(D) in formula 3) above reflects an heterogeneous world containing the development views of 7 different groups of individuals; and notice that if majority were the rule in that world there could be in theory 7 possible types of dominant development systems depending of which groups has the majority development choice.

Note now that if we make:

$$G1 = \sum_{h=1}^{q} IA \quad G2 = \sum_{j=1}^{r} IB \quad G3 = \sum_{k=1}^{s} IC \quad G4 = \sum_{l=1}^{t} IAB \quad G5 = \sum_{m=1}^{u} IAC \quad G6 = \sum_{o=1}^{v} IBC \quad G7 = \sum_{p=1}^{x} IABC$$

Then, we can restate the general development model(D) in formula 3) above as follows:

$$\text{4)}\quad D = G1 + G2 + G3 + G4 + G5 + G6 + G7$$

The general development model(D) in formula 4) above reflects the choices of 7 different groups, socialists(G1), capitalists(G2), environmentalists(G3), socio-capitalist(G4), socio-environmentalist(G5), eco-capitalists(G6), and sustainability based capitalists(G7).

Highlighting the different development waves

The development waves indicated above can be represented in two different ways to highlight both model type and development group type implications after specific assumptions are made.

i) Development waves in terms of paradigms

We can use the general development model(D) in formula 3) above to highlight the different development waves that can be associated with evolving development paradigm models as they are linked to evolving development preference assumptions indicated below:

First wave(D1) **Third wave(D3)**

$$5)\quad D = \sum_{h=1}^{q} IA + \sum_{j=1}^{r} IB + \sum_{k=1}^{s} IC + \sum_{l=1}^{t} IAB + \sum_{m=1}^{u} IAC + \sum_{o=1}^{v} IBC + \sum_{p=1}^{x} IABC$$

Second wave(D2)

The first development wave(D1) is linked to the assumption of independent choice; the second development wave(D2) is associated with the assumption of partially codependent choice; and the last wave(D3), the third wave, is associated with the assumption of fully codependent choice.

ii) Development waves in terms of development groups

The different development waves in terms of development groups can also be expressed using formula 4) above as follows:

First wave(D1) **Second wave(D2)** **Third wave(D3)**

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6) D = G1 + G2 + G3 + G4 + G5 + G6 + G7

Therefore, the first development wave(D1) is linked to groupings that work under the assumption of independent choice or rational independent decision makers, the socialist(G1), the capitalist(G2), and the environmentalists(C); the second development wave(D2) is associated with groupings that operate under the assumption of partially codependent choice or rational partially codependent decision makers, the socio-capitalists(G4), the socio environmentalists (G5), and the eco-capitalists(G6); and the last wave(D3), the third wave, is associated with the assumption of fully codependent choice or rational fully codependent decision makers, the sustainability based capitalists(G7).

The nature of the development waves in Formula 5 and 6 above can be clearly seen in Figure 1 below together with associated direction of paradigm death, paradigm mergers, and paradigm shifts:

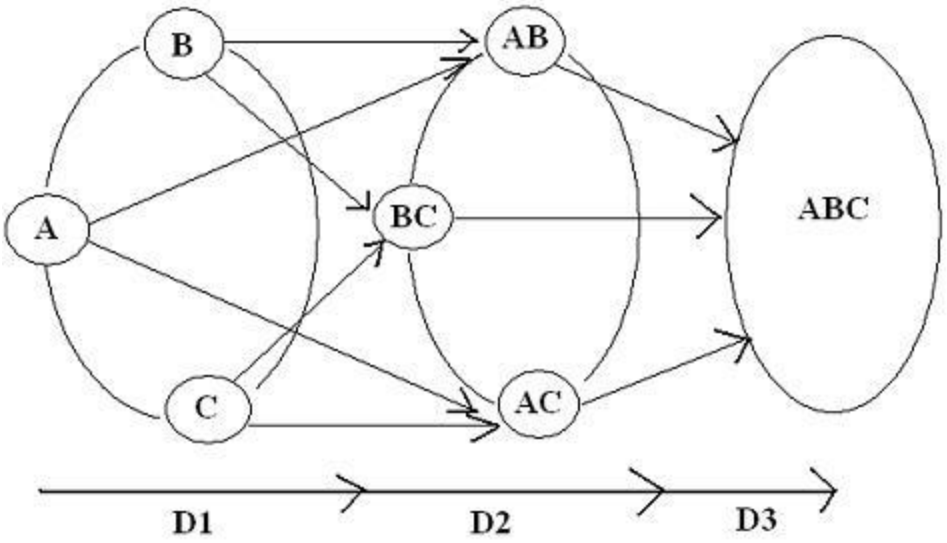

Figure 1 The development waves
The indepdendent choice wave(D1), the partially codependent choice wave(D2), and the full codependent choice wave(D3)

You can notice the following things about Figure 1 above: i) there are clearly three waves, D1, D2 and D3; ii) Between each wave the arrows show the different paradigm shifts linking each wave; iii) there is an independent model wave connected to a codependent model wave, which is connected to a fully codependent wave; and iv) the third wave D3 is the sustainability market wave, the last wave in this framework. And notice also in Figure 1 above i) that all partial partnerships models in the second wave(D2) have only one destination to shift towards to when closing sustainability gaps and this is the sustainability wave or sustainability markets; and ii) that the third wave(D3) is a more inclusive and stable position in sustainability terms than the second wave(D2); and the second wave(D2) is a more inclusive and stable position than the first wave(D1).

The first development wave(D1): The deep paradigm wave(DPW)

If we assume that only independent development choices are available, then the development models in formula 5) and 6) above become as indicated below as the development choices of the second wave(D2) and of the third wave(D3) are not available:

First wave

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q r s

7) D1 = DPW = ∑IA + ∑IB + ∑IC = G1 + G2 + G3 Where now **n = q + r + s**

h = 1 j = 1 k =1

Notice that the first development wave(D1) is driven by the interactions competing independent systems and development groups.

i) The nature of the first development wave(D1)

It is a heterogeneous world that summarizes the development choices of three competing development paradigm and development groups or rational independent decision makers, the socialists(G1), the capitalists(G2), and the environmentalists(G3). Notice that in theory under the first development wave(D1) if majority rule was at work there could be a socialist world(e.g. G1>G2>G3) or an environmentalist world(e.g. if G3>G1>G2) or a capitalist world(e.g. if G2>G1>G3).

ii) The structure of the old cold war(OCW)

As pointed out in the introduction since there has never been a deep environmental development system(EC), then G3 = ∑IC = 0 and the formula 7) above becomes the structure of the old cold war(OCW) as indicated below:

$$8)\quad OCW = \sum_{h=1}^{q} IA + \sum_{j=1}^{r} IB = G1 + G2 \qquad \text{Where now } n = q + r$$

The above formula 8) highlights that the old cold war was a clash between two competing models and development groups, red socialism group G1 = ∑IA and bare capitalism group G2 = ∑IB. Therefore, the clash in formula 8) is a clash between a non-market system and a market system and we know that the old cold war was won by the market system.

iii) The structure of Adam Smith's traditional market model(T)

If we assume that only economic development matters, then G1 = ∑IA = 0 and formula 8) above becomes:

$$9)\quad T = \sum_{j=1}^{r} IB = G2 \qquad \text{Where } r = n - q \text{ and } T = \text{The traditional market model}$$

Notice that here we have an independent system, the economic model(B) and an independent development group, the bare capitalists(G2), which work under independent choices and aggregate only economic choices; and in practice this was the case: this is the world of the

economic man, an independent decision maker. So here the theory-practice consistency principle was maintained.

iv) The structure of Karl Marx's red socialism model(K)

If we assume that only social development matters, then G2 = ∑IB = 0 and formula 8) above becomes:

$$10)\quad K = \sum_{h=1}^{q} IA = G1 \qquad \textbf{Where } q = n - r \textbf{ and } K = \textbf{Karl Marx's red socialist model}$$

Notice that here we need an independent system, the red socialist model(K) and an independent group, the red socialist(G1), that is supposed to works under independent choices and aggregate only society choices; and in practice this was not the case: this was the world of the red man, a not independent decision maker. So here the theory-practice consistency principle was not maintained.

The second development wave: The partial partnership paradigm wave(PPPW)

If we assume that only partially codependent development choices are available, then the development models in formula 5) and 6) above become as indicated below as the development choices in the first wave(D1) and of the third wave(D3) are not available:

$$11)\quad D2 = PPPW = \sum_{l=1}^{t} IAB + \sum_{m=1}^{u} IAC + \sum_{o=1}^{v} IBC = G4 + G5 + G6$$

Second wave

Where now **n = t + u + v**

See that the second development wave(D2) is driven by the interactions competing partially codependent systems and development groups.

i) The nature of the second development wave(D2)

It is also a heterogeneous world that summarizes the development choices of three competing partially codependent paradigms and development groups or rational partially

codependent decision makers, the socio-capitalists(G4), the socio-environmentalists(G5), and the eco-capitalists(G6). Notice that in theory under the second development wave(D2) if majority rule was at work there could be a socio-capitalist world(e.g. G4>G5>G6) or an socio-environmentalist world(e.g. if G5>G4>G6) or an eco-capitalist world(e.g. if G6>G4>G5).

ii) The structure of the future cold war

As highlighted in the introduction since there is not a viable socio-environmental development system(SEC), then G5 = ∑IAC = 0 and the formula in 11) above provides the structure of the future cold war(FCW) as indicated below:

$$12)\quad FCW = \sum_{l=1}^{t} IAB + \sum_{o=1}^{v} IBC = G4 + G6 \quad \text{Where } n = t + v$$

The above formula 12) highlights that the future cold war is a clash between the socio-capitalism/red capitalism group G4 = ∑IA and eco-capitalism/green capitalism group G6 = ∑IBC, which is a clash between two different market based systems.

iii) The structure of green market model(GM)

If we assume that only eco-economic development matters, then G4 = ∑IAB = 0 and formula 12 above becomes:

$$13)\quad GM = \sum_{o=1}^{v} IBC = G6 \quad \text{Where } v = n-t \text{ and GM = Green market model}$$

Notice that here we have a partially codependent system, the green market model(BC) and a partially codependent group(G6), which work under partially codependent choices and aggregate only eco-economic choices to maintain the theory-practice consistency principle: This is the world of the green economic man, a rational partially codependent decision maker.

iv) The structure of the red market model(R)

If we assume that only socio-economic development matters, then G6 = ∑IBC = 0 and formula 12) above becomes:

$$14)\quad R = \sum_{l=1}^{t} IAB = G4 \quad \text{Where } t = n - v \text{ and R = Red market model}$$

Notice that here we have a partially codependent system, the red market model(AB) and partially codependent development group, the socio-capitalists(G4), which work under partially codependent choices and aggregate only socio-economic choices to maintain the theory-practice consistency principle: This is the world of the red economic man, a rational partially codependent decision maker.

The third development wave: The full partnership paradigm wave (FPPW)

If we assume that only fully codependent development choices are available, then the development models in formula 5) and 6) above become as indicated below as the development choices in the first wave(D1) and in the second wave(D2) are not available:

Third wave

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x

15) D3 = FPPW = $\sum$IABC = G7 = S Where now n = x

p = 1

Notice that the third development wave(D3) is driven by the interactions of fully codependent systems(S) and development groups(G7).

i) The nature of the third development wave(D3)

It is a homogenous world that summarizes the development choices of rational fully codependent decision makers, the sustainability based capitalist group(G7). Notice that under the third development wave(D3) the whole world is under sustainability market rule. Notice that here we have a fully codependent system, the sustainability market(ABC) and fully codependent development group, the sustainability based capitalists(G7), which work under fully codependent choices and aggregate only socio-eco-economic choices to maintain the theory-practice consistency principle: This is the world of the sustainability man, a rational fully codependent decision maker.

Linking the development waves to paradigm death, mergers and shifts

The links between development waves are paradigm death, mergers and shifts, which can be easily appreciated in Figure 1 above: a) The society(A) and the economy(B) merged; and a shift towards socio-capitalism took place; b) the society(A) and the environment(C) merge and a shift towards the socio-environmental model(AC) takes place; c) the economy(B) and the

environment(C) merged and a shift towards the eco-economic or green market(BC) took place; and d) partial partnership models in the second development wave(D2) will either merge or shift directly to towards sustainability markets(S) as sustainability markets are the final and common destination for them in this framework of paradigm evolution.

Food for thoughts

a) Can micro-economics and macroeconomics be used to deal with green market issues? I say no, what do you think?

b) Can green micro-economics and green macroeconomics be used to deal with sustainability market issues? I say no, what do you think?

c) Can micro-economics and macroeconomics be used to deal with sustainability market issues? I say no, what do you think?

d) Can microeconomics or green microeconomics and macroeconomics or green macroeconomics be used to deal with red market issues? I say no, what do you think?

Specific conclusions

It was pointed out that development can be framed as a process that comes wave after wave, each wave more inclusive than the previous one. It was shown that the first development wave was one of deep development paradigms where the deep socialist model or red socialism and the deep economic model or bare capitalism were the main competitors and formed the structure of the old cold war. It was highlighted that the second development wave is one where socio-economic partnerships or red markets and eco-economic partnerships or green markets are the main competitors and form the structure of the future cold war and the dual reality in which we live now. It was stressed that the third development wave will be sustainability markets and since this is the only shift option that the relevant development partnerships of today have available when closing their respective sustainability gaps be it by internal or external pressures it will be according to the general development model the last development wave. It was indicated that between development ways there are paradigm death, mergers and shifts, which in the end lead towards sustainability. And finally, it was pointed out that development preference aggregation has evolved in parallel form as development paradigms have evolved from independent to partially codependent to full codependent structure as required to maintain the theory-practice consistency principle.

General conclusions

It was shown that it is possible to express development as separate waves linked by paradigm dynamics. It was pointed out that we are moving towards sustainability through development waves that are more and more inclusive each time, the first wave is made of deep paradigm based development, the second wave is made of partial partnership paradigm based development, and the their wave after sustainability gaps are closed is the full partnership paradigm based development or sustainability wave. It was also highlighted that evolution of development waves is linked to a parallel evolution in rational choice and preference aggregation structures. It was indicated too that the links between development waves are paradigm death, mergers and shifts. And finally, it was stressed that based on that general development model shared, the last wave is the third wave, the sustainability market or full partnership based development wave.

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