Sustainability thoughts 135: How can a general paradigm evolution model aimed at capturing all possible market evolution routes in response to binding sustainability gap pressures be stated step by step?

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Abstract

When markets are created, sustainability gap pressures associated to cost externalization dynamics embedded in them are also created. At the beginning, sustainability gap pressures are minimal, which seems to be one of the reasons why Adam Smith provided us with a traditional perfect market model in 1776 that works under externality neutrality assumptions; and therefore, there are no limits to economic growth. As the market expands its related sustainability gaps expands too, and it begins to affect the sustainability of that market. When markets have expanded to a point that their associated sustainability gaps may bring them down, then dealing with those sustainability gaps pressures becomes binding too in order for those paradigms to persist or avoid collapse. Now business as usual is no longer possible as if business as usual continues the market will collapse as the externalities previously assumed irrelevant are relevant. Moreover, the inability to fix or patch or the unwillingness to fix or patch binding sustainability gaps affecting the market can also brings along other paradigm evolution pressures such as flips towards authoritarianism or flips towards inverse opposite competing development paradigms, as then these paradigm evolution routes become more likely to take place as ways of addressing the same sustainability issues. Therefore, in response to binding sustainability gap pressures the market can subjected to calls for action by stakeholders such as the following: a) calls for implementing full cost internalization policies to fix fully the sustainability gap problem affecting the model; b) calls for implementing externality management programs to patch the sustainability gap problem; c) calls for flipping the model towards an inversely opposite market model, perfectly or imperfectly, to deal with the sustainability gap problem; and d) calls for flipping to a dictatorship based market model as a better way to address the same sustainability gap problem.

Understanding which response route markets such as the traditional market, the socialism market, the environmental market, the red socialism market and so on would take when dealing with their associated sustainability gap pressures is important, but this understanding is currently unclear. Hence, there is a need to develop a general model that captures all the possible response routes mentioned above that any market can take when facing binding sustainability gap pressures, which raises the question: How can a general paradigm evolution model aimed at capturing all possible market evolution routes in response to binding sustainability gap pressures be stated step by step?. Among the goals of this paper is to provide an answer to that question.

Key concepts

Sustainability, perfect markets, imperfect markets, sustainability markets, externality management markets, sustainability gap, paradigm fix, paradigm patch, paradigm shift, perfect paradigm flip, imperfect paradigm flip, dominant paradigm

Introduction

a) Markets and cost externalization

When markets are created, sustainability gap pressures associated to cost externalization dynamics embedded in them are also created. This situation is indicated through the use of a dummy market M_i driven by dominant component X_i as indicated in Figure 1 below:

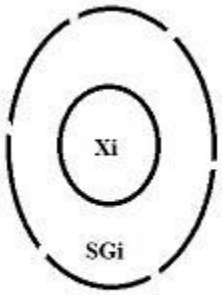

Figure 1 The structure of market Mi

We can see in Figure 1 that there is a sustainability gap SG_i embedded in the creation of the market Mi affecting its driver Xi so the structure of market Mi under sustainability gaps is Mi = Xi(SGi) and its structure under no sustainability gaps is Mi = Xi. This is because if we assume that externalities associated to production in market Mi are irrelevant they can be left out of the model Mi as then the market can expand without producing externalities, which is the market illusion associated with all markets that work under externality neutrality assumptions. The idea that cost externalization drives market towards more unsustainable paradigm evolution dynamics

has been recently highlighted(Muñoz 2021a) as well as the thought that externality neutrality assumptions lead to market illusions(Muñoz 2020a) and that cost externalization and market pricing mechanism are linked(Muñoz 2020b). Hence, we can see in Figure 1 above that if there are no sustainability gaps, the expansion of driver Xi leads to an expansion of model Mi without creating sustainability gaps; and we can also see that if there are sustainability gaps then an expansion in Xi leads to an expansion of Mi as well as to an expansion of its sustainability gap SGi.

At the beginning when markets are created, sustainability gap pressures(SGi) are minimal, which seems to be one of the reasons why Adam Smith provided us with a traditional perfect market model in 1776(Smith 1776) that works under externality neutrality assumptions; and therefore, it assumes no limits to growth so the traditional market(TM) has the structure of market M without sustainability gaps TM = M = Xi. With this structure the traditional market(TM) can expand without creating sustainability gaps. We know now by fact that assumption was wrong as indicated by shift in thinking from traditional market to green market thinking that started with the publication of "Our Common Future(WCED 1987) and which was materialized later with the 2012 Rio + 20 Conference on Sustainable Development(UNCSD 2012a; UNCSD 2012b).

b) Market expansions and sustainability gap pressure expansions

As the market Mi expands from X_1 to X_2 its related sustainability gap SGi also expands from SG_1 to SG_2, and the expansion of sustainability gaps begins to affect the sustainability of that market, a situation that can be appreciated in Figure 2 below:

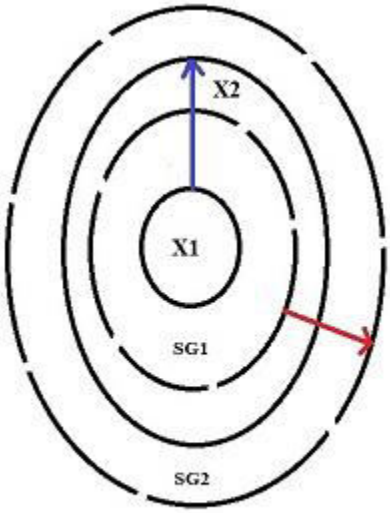

Figure 2 Market expansion leads to sustainability gap expansion

As indicated in Figure 2 above, the expansion of market Mi from point "X_1" to point "X_2" leads to an expansion of its sustainability gap from SG_1 to SG_2, which now begins to affect

the long term sustainability of market Mi. Since at point X_1 the market structure of Mi is $M_1 = X_1.SG_1$ and at point X_2 the market structure is $M_2 = X_2.SG_2$, so the expansion of M_1 to M_2 comes from the expansion of the drivers and the expansion of sustainability gaps. The expansion of sustainability gaps goes one to one with the expansion of unsustainability(Muñoz 2019).

c) Markets under binding sustainability gap pressures

When markets such as market Mi have expanded to a point that their associated sustainability gaps becomes binding(BSGi) so that Mi = Xi(BSGi), meaning that those sustainability gaps pressures may bring the model down if left unattended, then dealing with those sustainability gaps pressures affecting the market now becomes binding too in order for those paradigms to persist or avoid system collapse, as situation shown in Figure 3 below:

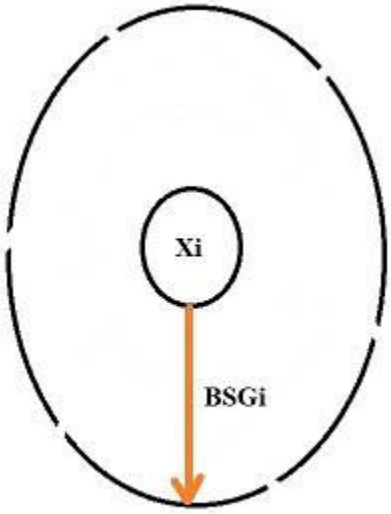

Figure 3 Market thinking under binding sustainability gap pressures(BSG)

Figure 3 above indicates that now the market Mi is under a binding sustainability gap(BSGi) threat and it needs to address it right away by either a full paradigm fix or by a paradigm patch as business as usual is no longer possible if we want to avoid system collapse as its market structure now is Mi = Xi(BSGi). In other words, binding sustainability gap pressures(BSGi) lead to the need to fix or to patch the market model to avoid a market collapse. For example, environmental inclusion was taken seriously at the 2012 Conference on Sustainable Development(UNCSD 2012a; UNCSD 2012b) to recalibrate the business as usual model in order to avoid the traditional market being brought down by its embedded environmental sustainability gap, a process that culminated with the Paris Agreement(UNFCCC 2015). However, instead of moving towards perfect green market thinking to fully fix the environmental sustainability problem highlighted in 1987(WCED 1987) development stakeholders concerned about environmental impacts have moved towards patching the problem through externality management frameworks instead. How green markets would have looked like if the World

Commission on Environment and Development(WCED) would have recommended a full fix has been recently highlighted(Muñoz 2020c) as well as the idea that perfect markets shift to higher level perfect markets when fully fixed such as the shift from the perfect traditional market to the perfect green market(Muñoz 2021b).

Moreover, the inability to fix or patch a paradigm due to paradigm shift knowledge gaps or the unwillingness to fix or patch the binding sustainability gaps affecting the market can also brings along other paradigm evolution pressures such as flips towards authoritarianism or flips towards inverse opposite competing development paradigms as then these paradigm evolution routes become more likely to take place or be followed under the pretext that mainstream market thinking is not working. It has been pointed out recently that if paradigm shift knowledge gaps do not allow for a specific paradigm under sustainability gap pressures to be fixed or path, then that paradigm will flip towards a competing market structure(Muñoz 2020d). For example, authoritarianism is often sold as a better way to address sustainability gap pressures to the masses or socialism, democratic or not, was sold as a better way to deal with social sustainability gaps found in capitalist countries given that capitalism based countries were not interested in addressing their social sustainability gap issues.

Therefore, in response to binding sustainability gap pressures a market can be subjected to calls for action such as the following: a) calls for implementing full cost internalization policies to fix fully the sustainability gap problem affecting the model; b) calls for implementing externality management programs to patch the sustainability gap problem; c) calls for flipping the model towards an inversely opposite market, perfectly or imperfectly, to deal with the sustainability gap problem; and d) calls for flipping the market to a dictatorship based market as a better way to address the same sustainability gap problem.

d) The need to understand those response routes to binding sustainability gap pressures and place them under the same framework

Understanding which response route markets such as the traditional market, the socialism market, the environmental market, the red socialism market and so on would take when dealing with their associated sustainability gap pressures is important, but this understanding is currently unclear. Hence, there is a need to develop a general model that captures all the possible response routes mentioned above that any market can take when facing binding sustainability gap pressures, which raises the question: How can a general paradigm evolution model aimed at capturing all possible perfect market evolution routes in response to binding sustainability gap pressures be stated step by step?. Among the goals of this paper is to provide an answer to that question.

Goals of this paper

a) To point out the structure of markets when being fixed, patched, flipped to inverse opposite and when flipped to authoritarianism in response to binding sustainability gap pressures one at a time; and b) to link all market structures to state a general paradigm evolution model that captures all those responses.

Methodology

First, the terminology used in this paper is introduced. Second, the operational concepts and typology of paradigms and paradigm evolution rules are shared. Third, the structure of markets when under full paradigm shift pressure is indicated. Fourth, the structure of markets when under paradigm patch pressure is described. Fifth, the structure of markets when under perfect and imperfect paradigm flip pressures is highlighted. Sixth, the structure of markets when under authoritarianism pressures is given. Seventh, the structures of all market pressures are linked together and place in the same framework to highlight the general paradigm evolution model. And finally eight, some food for thoughts and relevant conclusions are provided.

Terminology

M1 = Perfect market M1 [M1] = Imperfect market M

[M1] = Authoritarian market M1 M_{M1} = M1 under externality management

PS = Perfect shift IS = Imperfect shift

PF = Perfect paradigm flip IF = Imperfect paradigm flip

M = Perfect lower level market M N = Perfect lower level market N

L = Perfect higher level market L [ ] = Authoritarianism

[M] = Market M under authoritarianism [N] = Market N under authoritarianism

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Operational concepts, types of market structures and model evolution rules

a) Operational concepts

1) Perfect market, *a market where there is dominant component equality and freedom*

2) Imperfect market, *a market where there is component equality, but not freedom*

3) Perfect paradigm shift, *a shift from a perfect market to a higher level perfect market*

4) Paradigm management, *the handling of cost externalization through externality management*

5) Paradigm flip, *a flip to the inverse opposite paradigm*

6) Perfect paradigm flip, *a flip to the perfect inverse opposite paradigm*

7) Imperfect paradigm flip, *a flip to the imperfect inverse opposite paradigm*

8) Authoritarian market, *an imperfect market*

9) Sustainability market, *the perfect market where there is full co-component equality and freedom*

10) Externality management market*, the market where there is partial co-component equality, but no freedom.*

b) Type of market structures

Given the dummy market models M_1= Xy and M_2= xY, the following can be said about different market structures:

1) Perfect markets

There is dominant component equality and freedom

M_1 = Xy = A dominant component X perfect market

M_2 = xY = A dominant component Y perfect market

2) Imperfect markets

There is dominant component equality, but no freedom, they are dictatorship based markets

[M_1] = [X]y = A dominant component X imperfect market

[M_2] = x[Y] = A dominant component Y imperfect market

3) Externality management market

They are ongoing government intervention based markets

M_{M1} = XY_M = A dominant component X externality Y management market

$M_{M2} = X_M Y$ = A dominant component Y externality X management market

4) The sustainability market

The perfect market where there is full co-component equality and freedom

$S = M_1.M_2 = (Xy)(xY) = XY$

Details about paradigm merging rules and paradigm shift rules can be found in the publication about paradigm evolution and sustainability thinking(Muñoz 2019).

c) Model evolution rules

i) Perfect paradigm shift

The externality gap affecting the market, y or x, is fully closed and internalized

PS

$M_1 = Xy$----------→ $M_3 = XY$

PS

$M_2 = xY$----------→ $M_3 = XY$

ii) Imperfect paradigm shift or imperfect dominated component flip

The externality gap affecting the market, y or x, is patched and managed as an externality problem

IS

$M_1 = Xy$----------→ $M_4 = XM_Y$

IS

$M_2 = xY$----------→ $M_5 = M_X Y$

iii) Perfect paradigm flip

Paradigms flip to the perfect inverse opposite model

PF

$M_1 = Xy$----------→ $M_2 = Xy$

PF

M_2 = xY----------→ M_1 = Xy

iv) Imperfect paradigm flip

Paradigms flip to the imperfect inverse opposite model

IF

M_1 = Xy----------→ M_6 = x[Y]

IF

M_2 = xY----------→ M_7 = [X]y

Linking market model Mi to perfect market thinking

If we assume that model Mi described in the introduction is of the form perfect market Mi = M = M_1 = Xy so that the perfect market Mi = M = M_1 is under the influence of the binding sustainability gap BSG_Y = y, which means so that Mi = M = M_1 = X(BSG_Y) = Xy, then we have a situation as indicated in Figure 4 below:

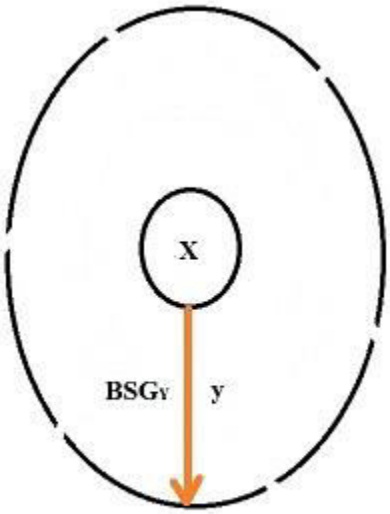

Figure 4 Market M under binding sustainainability gap pressures BSG_Y = y so M = Xy

Hence, we can use model M = Xy in Figure 4 above to capture all the different calls for action related to how to deal with the unsustainability generated by the binding sustainability gap "y" affecting the dominant component X as it is indicated below, step by step.

The full fix market response structure

The call to fully fix the sustainability gap affecting model M relates to the need to fully internalize the externality cost "y" in the pricing mechanism of the one dominant component market M, as when doing that the market shift towards a higher level co-dependent market, which can be indicated analytically as follows:

PS

1) M = Xy----------→ L = XY since y----→Y

Expression 1) above simply says that when we close the sustainability gap "y" through full cost internalization, then "y" becomes "Y" as market M shifts to perfect market L, a situation that can be expressed graphically as in Figure 5 below:

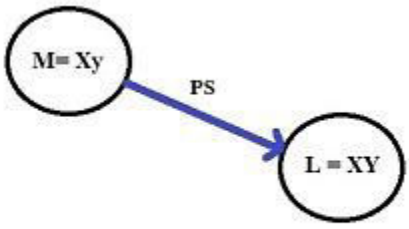

Figure 5 The paradigm fix pressure leading the perfect shift

We can see in Figure 5 above that when the sustainability gap "y" in model M is closed, there is a perfect shift to market L so there is a perfect shift(PS) from a one dominant component market to a two dominant component market. In other words, full cost internalization induces a perfect paradigm shift from model M to a higher level sustainability model L.

The partial fix market response structure

The call to patch the sustainability gap affecting model M relates to the use of externality management tools where instead of internalizing externality cost, they are managed and when doing so the market shift towards an imperfect externality management market, which can be stated analytically as follows:

IS

2) M = Xy----------→ $M_M = XM_Y$

Expression 2) above simply tells us that when we manage the sustainability gap "y" through externality management, then "y" becomes "M_Y" as market M shifts to imperfect market

M_M leaving the sustainability gap affecting X still active as cost M_Y < y, a situation that can be shown graphically as in Figure 6 below:

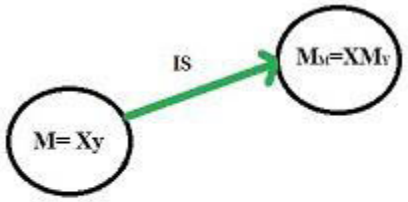

Figure 6 The paradigm patching pressures leading the imperfect shift to externality management

We can see in Figure 6 above that when the sustainability gap in model M is managed through externality management M_Y, there is an imperfect shift(IS) from market M to market M_M, a shift from a perfect market model to an imperfect one as the environmental management market model is not a free market.

The inverse flip market response structure

The call for market flip to address the sustainability gap affecting model M relates to taking the inverse opposite competing paradigm structure, both perfectly and imperfectly as indicated below:

i) The structure of the perfect flip:

If the structure of perfect market M is M = Xy, then the perfect inverse opposite model is model N = xY, so the perfect flip has the form:

PF

3) M = Xy----------→ N = xY

Expression 3) above is telling us that when we trade full component dominance and core values of one market for those of the inverse opposite market to leave sustainability gap pressures behind we have a perfect flip from a perfect market to another same sustainability level perfect market. Notice that the core values of market N are fully the inverse opposite core values found in market M.

ii) The structure of the imperfect flip:

If the structure of perfect market M is M = Xy, then the imperfect inverse opposite model is [N] = x[Y], so the imperfect flip has the form:

IF

4) M = Xy----------→ [N] = x[Y]

Expression 4) above shows that when we do not trade full component dominance and core values of one market for the inverse opposite market to leave sustainability gap pressures behind then we have an imperfect flip, a flip from a perfect market to an imperfect market. Notice that the core values of market N are not fully the inverse opposite core values found in market M as in model [N] there is no dominant component freedom, only equality as it is an authoritarian based model.

The structure of the perfect and imperfect flip can be indicated graphically as shown in Figure 7 below:

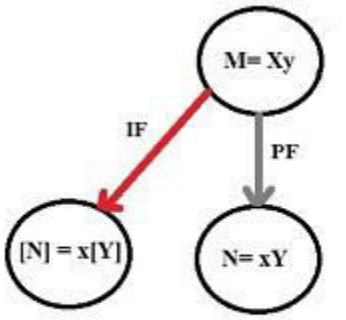

Figure 7 The perfect and imperfect inverse opposite paradigm flip pressure on model M

We can see in Figure 7 above two things: a) the perfect flip from perfect market M to perfect market N requires a perfect full flip of dominant and dominated components at the same time since "X" flips to "x"; and "y" flips to "Y"; and b) the imperfect flip from perfect market M to imperfect market [N] needs a full flip of dominant component and a partial flip of the dominated component as "X" flips to "x", but "y" flips to [Y]. In other words, the perfect flip from M to N is a flip from component X equality and freedom to component Y equality and freedom while the imperfect flip from M to [N] is a flip from component X equality and freedom to component [Y] equality, but no freedom.

The authoritarian flip market response structure

The call for authoritarianism flip to address the sustainability gap affecting model M relates to flipping the perfect market M to an imperfect market or authoritarianism based market. If the structure of perfect market M is M = Xy, then the imperfect structure of market M is [M] = [X]y so the authoritarianism or imperfect market flip has the form:

IF

5) M = Xy----------→ [M] = [X]y

Expression 5) above shows that when we trade market freedom for no market freedom we flip from a perfect market M to an imperfect market [M] as only dominant component equality remains. Notice that the core values of in market M are dominant component equality and freedom and the core values in market [M] is dominant component equality only as they are non free markets.

The structure of the imperfect flip from perfect market to authoritarianism can be shown graphically as in Figure 8 below:

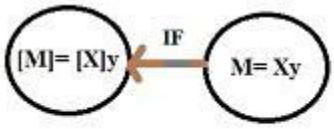

Figure 8 The authoritarianism flip pressure on model M

We can appreciate using in Figure 8 above that the imperfect flip from perfect market M to imperfect market [M] needs only a partial flip of dominant component as the sustainability gap "y" stays the same since X flips to [X]. In other words, the imperfect flip from M to [M] is a flip from component X equality and freedom to component [X] equality only as this is not a free market.

The general paradigm evolution model structure

If we link all the possible paradigm evolution pressures discussed above to model M = Xy, then we frame the structure of the general paradigm evolution model as described graphically in Figure 9 below:

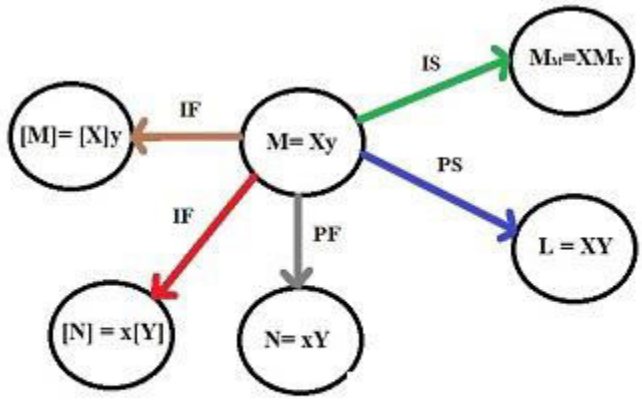

Figure 9 Paradigm M under all types of pressures provides the structure of the general paradigm evolution model under sustainability gap pressures

Figure 9 above indicates the unsustainability created by the binding sustainability gap "y" affecting model M can lead to a) in terms of model structure, to a full fix(model L), to a patch(model M_M), to a perfect inverse opposite model(model N), to an imperfect inverse opposite model(model [N]), and to an imperfect market M or dictatorship based market M(model [M]); and b) in terms of paradigm dynamics, to a perfect shift(PS) to a co-dominance market(model L), to an imperfect shift(IS) to an externality management market(model [M_M]), to a perfect inverse opposite flip(PF) to model N, to an imperfect inverse opposite flip(IF) to model [N], and to an imperfect flip(IF) to authoritarianism like model [M].

Implications:

Based to Figure 9 above three main implications can be highlighted: i) to keep its full dominant core values while addressing the binding sustainability gap "y" model M = Xy has two choices, a full fix or a patch. If there are no paradigm shift knowledge gaps, we should expect model M to implement a full fix so it can keep the core values of driver X. If there are paradigm shift knowledge gaps or paradigm M simply refuses the full fix option it has to go the way of paradigm patch, which allows it to still keep the core values of X intact; and ii) when paradigm M goes the way of paradigm flip, be it the inverse opposite paradigm perfectly(model N) or imperfectly(model [N]) or the imperfect authoritarianism based market([M]) it loses the core values of X either fully or partially; and iii) If instead of model M = Xy at the centre at the general model we had model L or model M_M or model N or model [N] or model [M], then that general model, given the existence or not of paradigm shift knowledge gaps and/or given the existence or not of paradigm flip choices and/or given the existence of the will or not to implement full fixes or externality management programs, can be used to appreciate the choices or paradigm evolution routes(likely or most likely) available to paradigm evolution dynamics.

Food for thoughts

1) Was the red socialism market an imperfect social market? I think Yes, what do you think?; 2) Was an imperfect paradigm flip back what allowed China to keep its loyalty structure in the hands of the communist party intact when red socialism fell in 1991 and flipped back to capitalism? I think Yes, what do you think?; 3) Are externality management based markets perfect markets? I think No, what do you think?; 4) Is democratic capitalism consistent with perfect market thinking? I think Yes, what do you think?; and 5) Is non-democratic capitalism consistent with imperfect market thinking? I think Yes, what do you think?

Conclusions

First, it was shown that under sustainability gap pressures when they become binding paradigms can be fixed, can be patched, can be flipped perfectly or imperfectly to the inverse opposite paradigm, and they can be flipped to authoritarianism. Second, it was pointed out that when we place all possible actions that can be taken to address those sustainability pressures affecting specific market paradigms we frame a general paradigm evolution model. And third, it was highlighted that this general model can be used to assess all the possible paradigm evolution routes given the structure of the specific paradigm under pressure at the centre of the general paradigm evolution model.

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