The role of higher education stakeholder networks for sustainable development: a systems perspective

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ABSTRACT
Can stakeholder organisations support and put pressure on organisational change at universities to implement sustainable development? In recent years, universities across the world have made progress in both promoting and implementing sustainable development (SD). However, despite the fact that the United Nations message that stakeholder participation is crucial for the implementation of sustainable development (in particular SDG 17: Partnerships for the goals), research on the role of higher education stakeholder networks in the context of organisational change towards sustainable development remains underdeveloped.
First, the paper discusses state of the art literature on the role of stakeholder networks for the implementation of sustainable development in higher education. Secondly, using a systemic approach the paper explores some potential steps for addressing the practical and policy challenges required to support the implementation of sustainable development through the role of stakeholder networks. The paper then critiques the present and future prospects of such relationships.
This paper will present a systemic perspective of how universities can be more attuned and adapt to continue the promotion of sustainable development goals amongst their community of influence. It will also be useful for practitioners and policy makers working to address sustainable development implementation challenges in higher education.

Keywords: Systems thinking, Soft systems methodology, Networks' co-learning, Bottom up approaches, Eco-pedagogy.

1. Introduction

The United Nations supported the development of the Millenium Goals that were adopted in Millennium Declaration in 2000 (UN 2000). Later, these Goals were developed through a participatory process that became the Sustainable Development Goals (SDGs; UN 2015). Sustainable development has been defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987: 41). Apart from the Earth Charter, (Earth Charter Commission 2000), sustainable development is the only framework to date that speaks to a wide range of people, including policy makers, internationally (Estes 2010; Baker et al. 2005). Furthermore, like the Earth Charter, the SDGs are considered by many to be a democratic framework to address such transformative global challenges. However, there are large portions of the population that are still not aware of or are confused by the SDGs and there are critics who consider them to be too orientated to the values of the North (Kahn 2010: 20).

The United Nations have suggested that the transition to sustainable development ought to be achieved by the engagement of society at all levels (UN 2015). The United Nations has signalled the importance of education, including higher education, in contributing to the achievement of sustainable development goals, as well as achieving the 2030 Development Agenda (UN 2015).

In recent years, higher education institutions have been pressured to consider their ethical investments, procurements and actions. In the United Kingdom, this trend has been largely driven by students holding their universities to account and the universities then being concerned about their marketing profile for student recruitment. One example in 2019 is the University of Manchester, where students staged a week-long occupation in protest against the university's £12m investments in fossil fuels, forcing it to bring forward its financial review (Wootton-Cane 2019). Indeed, half of the UK public higher education institutions have divested from pension funds and investment portfolios that include identifiable unethical operations (Taylor 2020). Consequently, universities are having to think carefully about the stakeholders they choose and ethically concerned stakeholders are careful about which higher education institutions they wish to associate with.

Also, higher education institutions have developed and signed international commitments to integrate sustainable development into their activities (Lozano et al. 2013). However, there is not yet coherence between international, national and organisational policy frameworks (for instance for the UK where policy frameworks exist; Vargas et al. 2019b).

In addition to these changes, universities are currently seeking funding avenues different from governmental ones (Godemann et al. 2014). Some universities are organisations where the public and private sectors converge, and accountability is linked to result measures (Schmidt & Günther 2016). In addition, Australasian, European and US higher education is progressively seen as a significant sector in the economy (Godemann et al. 2014). Therefore, some universities have developed quasi corporate characteristics (Godemann et al. 2014).

These issues relate directly to the ways in which universities address the SDGs, affecting their policies and implementation of procurement, estate management, curricula, research, professional development training, community relations and stakeholder networks. In other words, the SDGs affect every aspect of university governance and operation, each representing a system of management.

Although leaders, academic and administrative staff, and students have started to work towards the implementation of sustainable development in higher education institutions, embedding it in the everyday practice of higher education is still facing difficulties, especially in terms of systemic change (Dlouha et al. 2018). There are different reasons for this that have been explored in the literature. One of the reasons suggests that higher education institutions could be described as complex systems and this makes driving change particularly difficult

(Godemann et al. 2014). Studies have shown that, arguably 'developed', education systems such as the UK, include in their sustainable development policy frameworks a number of organisations with different functions and interactions between them (Vargas et al. 2019).
According to the UN and echoed in SDG 17, partnership work is crucial for the implementation of sustainable development (UN 2015). There is evidence that suggests that organisational change can be influenced by the pressure of stakeholders (Radinger-Peer & Pflitsch 2017). Moreover, the collaborative work between stakeholders can be defined through the development of networks (Dlouha et al. 2018; Vargas et al. 2019). However, only a few papers have studied this phenomenon in the context of sustainable development in higher education, suggesting that in this context, such systems of higher education sector are complex (e.g. Godemann et al. 2014; Dlouha et al. 2018; Vargas et al. 2019).
Systems thinking (ST) as a way of tackling complexity in management practice has been around for more than four decades but despite its obvious advantage, systems thinking has been overlooked as a means of identifying, analysing stakeholders' involvement in organisations and assessing their role in driving change. One of the key approaches for systems thinking is Soft Systems Methodology (SSM). SSM has widely been used in structural thinking and the intervention into complex organizational problems by addressing management systems that are complex in nature, and it seeks to assess as many diverse possibilities as possible. This approach has been used in many fields that include human resource management, planning of information systems, the planning of health and medical systems and the development of expert systems among many more.
Therefore, this paper aims to explore the potential for stakeholder networks to drive change towards (and beyond) sustainable development. For this the paper will first explore three research questions:

a) What elements of the role of stakeholder networks support organisational change according to the current academic literature?
b) How can Systemic Approaches, (i.e., Soft Systems Methodology (SSM)) assess (and measure) the efficacy, efficiency and effectiveness of stakeholders' networks in its role of implementing sustainable development Goals in HEIs?
   In order to answer these two research questions, the paper reviews the extant literature on: (1) stakeholder networks as drivers of organisational change; and (2) systemic thinking concepts suitable to tackle complexity and assist organisational change. Based on this review the paper will then discuss (3) future scenarios for the development of higher education stakeholder networks for and beyond the implementation of sustainable development. For this, the following research question will be explored.
c) How may higher education institutions and their stakeholders support sustainable living as a co-learning system?

2. Stakeholder networks as drivers of sustainable development implementation in higher education institutions

Empirical studies have shown that internal and external stakeholders have the potential to influence change in organisations. Internal networks could potentially drive bottom up activity. External networks to the university could potentially drive bottom up activity at national level (Vargas et al. 2019) and possibly internationally. Although individual stakeholders can facilitate organisational change, this becomes more powerful when stakeholders organise themselves and work together. Collaboration between stakeholders can create formal or informal networks. Networks may be understood as fluid organisations and the interactions between their members tend to change over time. Even in the cases where there are formal structures, networks work differently in practice compared to what might be expected of them.

However, there have been some advances in the academic literature which show how network characteristics can facilitate the effectiveness of the network and its aim.

Higher education institutions have been labelled in the literature as loosely coupled systems (Godemann et al. 2014). In simple terms, this refers to the dynamics within organisations that result in elements affecting each other suddenly, occasionally and indirectly (Godemann et al. 2014). Due to these characteristics, Godemann et al, conclude that stakeholder engagement in higher education institutions is particularly challenging due to its fluidity (2014). In addition, academic freedom allows academics to make decisions about their engagement with their preferred topics and specific stakeholders. This means that sustainable development is likely to be difficult to implement through top down approaches only (Vargas et al. 2019). Top down approaches refer to practices or policies actively promoted by senior leadership who are at the top of the hierarchy in an institution and represent common forms of organisational structures. Therefore, it is crucial to look at how networks could be developed to help drive bottom up change.
Traditionally, networks were not thought of as entities requiring formal leadership and governance models to function (Provan and Kenis 2008). More recently, the literature that is focused on networks shows that networks do require a form of leadership and benefit from clear governance structures suitable for the characteristics of the network (Provan & Kenis, 2008). The appropriate model may depend on network characteristics such as the number of members and density (Provan & Kenis 2008). Density refers to the number of actual connections or interactions between members of the network compared to the total number of connections between network members that are possible (Scott and Carrington 2014). The networks as presented in the sustainable development policy frameworks for higher education in the UK have low density (Vargas et al. 2019). As a result, it is unlikely that this type of network could benefit from shared governance and leadership (Vargas et al. 2019). Exploring network characteristics could, therefore help improve networks.
One of the few studies, so far, that has looked at this phenomenon in the context of sustainable development implementation in higher education is Vargas et al (2019). This paper focused on the stakeholder networks mentioned in the UK's national higher education policy frameworks. The study found that sustainable development networks in higher education as presented in the policy frameworks are vulnerable and fragile (Vargas et al. 2019). The reasons for this are a lack of vocabulary pertaining to funding routes, low network density and high centrality of few members (Vargas et al., 2019).

Often in the literature, network leadership models have been highlighted through the use of centrality measures of networks (Hristov et al. 2018). Centrality refers to the number of links between one stakeholder or node in the network and others. The higher number of links equals higher centrality of the stakeholder. The findings from Vargas et al (2019) about the vulnerability that a network might have due to the high centrality of one main organisation, may suggest that involving more members of the network in its leadership might be more appropriate for emerging agendas such as sustainable development in higher education.
Traditionally, theories of leadership have had a focus on individuals (Hristov et al. 2018). However, the focus on 'orthodox and heroic' leadership has changed into a focus on 'collective forms of leadership' (Hristov et al. 2018: 127). This change of paradigm has led to the recognition of leadership enacted by groups of individuals between and within institutions. This is sometimes referred to as distributed leadership and it highlights the presence of collaboration in processes requiring leadership (Hristov et al. 2018). There is an opportunity to pursue more studies focused on the practice of distributed models of leadership and the reasons for these models to be used (Hristov et al. 2018).

In addition, distributed leadership can be beneficial for the implementation of the Sustainable Development Goals (Wilson 2018; Kuenkel 2019). Therefore, distributed leadership is crucial to explore stakeholder networks for the implementation of sustainable development in higher education.

One potential avenue to develop the literature on sustainable development in higher education would be to identify and study practices of distributed leadership in inter and intra-organisational stakeholder networks. In order to develop this, perhaps studies could focus on finding out who are the stakeholders with high centrality in higher education networks and what their roles are in terms of supporting organisational change towards the implementation of sustainable development.

To conclude, although the literature on higher education stakeholder networks for sustainable development is underdeveloped (Godemann et al. 2014), the brief literature review presented above suggests that formal or informal, and internal or external stakeholder networks have the potential to play a crucial role in the implementation of sustainable development in higher education. Also, the characteristics of these networks including their leadership model can help estimate some of their potential impact. However, studying universities' internal and external stakeholder networks requires the understanding of different systems e.g. organisational, national and international. The next section, therefore, explores systems thinking and related methodologies for the analysis and assessment of higher education stakeholder networks for sustainable development.

3. Systems Thinking, analysis and assessment of stakeholders' networks in HEIs

When assessing the performance of a system, the relationships of the components within the system are of crucial importance. Through this premise, systems thinking gains a bigger picture. Systems thinking advocates the importance of making a conscious effort to appreciate other people's perspectives. C. West Churchman, described the systems approach both as a process in which one needs to 'sweep in' as many elements and actors affected as possible; and as a process of looking at the situations from different perspectives, indicating that- *"A systems approach begins when first you see the world through the eyes of another"* (Churchman 1968: 231).

In theory, these are the principles underpinning systemic thinking but when we try to apply them we need to use a methodology to guide the use of these principles. We outline soft systems methodology (SSM) a systemic methodology developed by Peter Checkland (1981, 1999). SSM has been widely used in management to tackle complexity and to bring improvement in a particular complex, messy situation (Ackoff 1993, 1995) and possibly to introduce some changes.

3.1 Soft Systems Methodology (SSM) a way of enquiring about complexity

Peter Checkland's Soft Systems Methodology (SSM) is one of the most developed Systems Methodologies in terms of its theoretical premises and philosophical underpinnings. It is also one of the most widely used in the UK and in other parts of the world (Mingers, and Taylor 1992; Ledington & Donaldson 1997; Macadam and Packham 1989; Macadam et al. 1995; Paucar-Caceres et al. 2015). During the 1970s, Checkland and his colleagues at Lancaster University questioned the use of hard (reductionistic) systems thinking to real-world situations and started to test a new methodology that shifted the *systemicity* from the real world to the process of enquiry itself. In other words, we can use systems to enquire about the real world.

In essence, SSM articulates a learning process which takes the form of an enquiry process in a situation that people are concerned about. This process leads to action in a never-ending learning cycle: once the action is taken, a new situation with new characteristics arises and the learning process starts again. The methodology is summarised in Fig 1. This is the SSM best

known methodology and although Checkland has expressed a most flexible way of applying his ideas in his latest book (Checkland and Scholes 1990), the 7-stage methodology is still the most convincing and helpful account of the SSM enquiry.
The basic structure of SSM rests on the idea that in order to tackle real-world situations, we need to make sure that the 'real-world' is separated from the 'systems thinking world'. This distinction is crucial for SSM because that assures us that we won't see systems 'out there'; that is in the real world. SSM urges us to consider 'systems' as abstract concepts (preferably, the word 'holons' should be used) which, when applied to the real-world, can eventually help to bring some improvements to the situation concerned.

3.2 Soft systems methodology (SSM): managing and controlling the transformation process

Broadly speaking, the hard, reductionistic approach follows a positivistic epistemology, whereas SSM follows an interpretive perspective (Checkland 1981; 1986; Checkland and Scholes 1990; Jackson 1992, 2003). This can be summarised as follows: According to Checkland, life world is an ever-changing flux of events and ideas and 'managing' means reacting to that flux. We perceive and evaluate, take action(s) which itself becomes part of this flux which lead to next perceptions and evaluations and to more actions and so on. It follows that SSM assumes that different actors of the situation will evaluate and perceive this flux differently creating issues that the manager must cope with. Here, SSM offers to managers the systems ideas as a helpful tool to tackle problematic situations arising from the issues. The world outside seems highly interconnected forming wholes; therefore, it seems that the concept 'system' can help us to cope with the intertwined reality we perceive. Figure 1 shows the basic structure of Soft Systems Methodology.

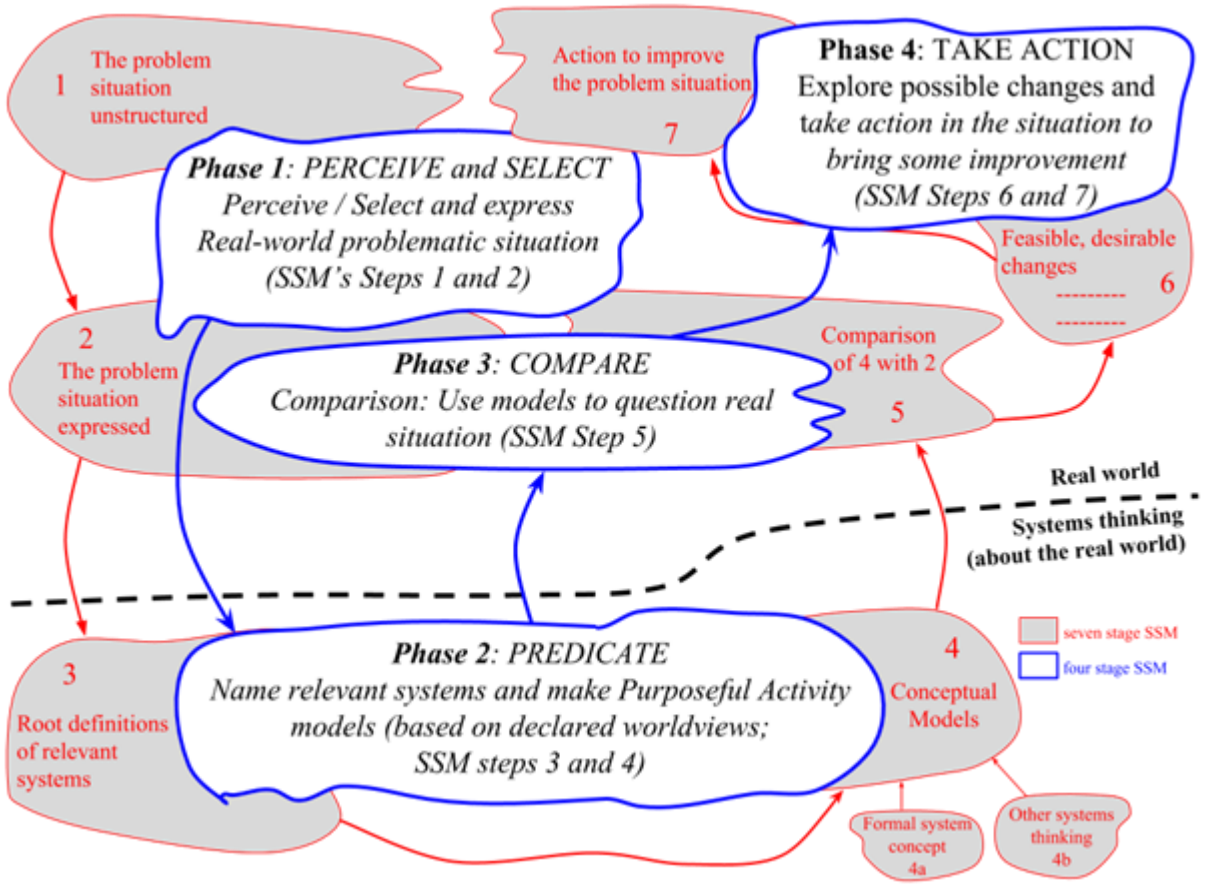

Figure 1. The Basic Structure of Soft Systems Methodology: Four phases (Perceive/Select; Predicate; Compare; and Take Action) and SSM 7 steps/stages (Source: Jerardino-Wiesenborn, *et al* (2019), based on Checkland 1981)

3.3 Measuring the performance of a system with SSM: CATWOE, the transformation process and the Three 'Es': efficacy, efficiency and effectiveness

The issue of measuring the performance of a system is first mentioned by Checkland with relation to the attributes of the formal system model (Checkland 1981). The formal system model, 'S', is described as a device that can be used as a way of validating the model of the system currently being studied: *"S is a formal construct aimed at helping the building of conceptual models which are themselves formal"* (Checkland 1981:174). Checkland lists a number of conditions for 'S' to be formal, one of these conditions is that 'S' should be measured; 'S' is said to have a measure of performance capable "to signal progress or regress in pursuing purposes or trying to achieve objectives" (Checkland 1981: 174).

CATWOE is the mnemonic of the six crucial characteristics which should be included in a well-formulated root definition.

C 'Customers' - the beneficiaries or victims of the transformation process
A 'Actors' - those who would undertake the transformation process
T 'Transformation' - the conversion of input to output
W 'Weltanschauung' 'worldview' - the worldview that makes this transformation meaningful
O 'Owners' - those who could stop the transformation
E 'Environmental constraints' - elements outside the system which are taken as given.

From these elements, T is at the core of any root definition encapsulating the concepts that inputs are transformed into outputs as the root definition suggests.

T, the transformation process, is the CATWOE element on which Checkland elaborates the notion of measuring the performance of the system. According to Checkland, at the most fundamental level, any purposeful activity may be expressed through a Transformation Process which "changes or transforms some input into some output". In other words, for the *Transformation* to be relevant, Inputs are present in Outputs but in a changed state. Then if the Input is abstract (e.g. 'need for nursing services') then the Output must also be abstract (e.g. 'need met'). If the Input is concrete (e.g. 'a patient') then the Output must be concrete (e.g. 'a treated patient'). This distinction is important because it helps to differentiate between the resources and the inputs of the system. SSM also stresses the fact that there are many ways of expressing a purposeful activity; more ways of expressing the activity in terms of Input-Transformation-Output will enrich the thinking.

According to SSM, when we try to 'manage' purposeful 'systems', it is useful to think of this situation in terms of:

(a) a purposeful system arranged as a set of activities which we may call the "operational system" (a set of linked activities to do 'x').
(b) a set of activities which will inspect the performance of the operational system and eventually will take action to bring it into line with aims and expectations; this is the "monitoring and control" system which monitors and controls the doing of 'x' and shown by the **inner** subsystem in Figure 2.
(c) The system can be thought of as part of a wider system which decides to do 'x' (the 'what') or decide the way (the 'how') in which 'x' is carried out; these decisions are carried out by its own "monitoring and control" system which monitors and controls the long term objective of the system located on an upper level. This is shown by the **outer** system of Figure 2. The

criteria by which the Transformation can be judged gives the elements by which we can measure the performance of the system.
So, if we think of the two levels expressed in Figure 2, we should ask the question: **How can the Transformation fail?** For controlling purposes and ultimately for 'managing' this activity, the following reflections and possible answers are useful:

(a) The way chosen to do **T** might not work; therefore, we manage **T** by asking: Does **T** mean selected work? The answer measures the **Efficacy** of **T**, measured by the monitoring and controlling activities at the 'operational system' level.
(b) Is **T** being done with minimum resources (including time)? We manage **T** by asking: Is **T** being done with minimum resources? The answer measures the **Efficiency** of **T**, measured by the monitoring and controlling activities at the 'operational system' level.
(c) **T** could the wrong activity to be doing. We manage **T** by asking: Is **T** the right thing to be doing? The answer measures the **Effectiveness** of the System, measured by the monitoring and controlling activities at the 'planning system' level.

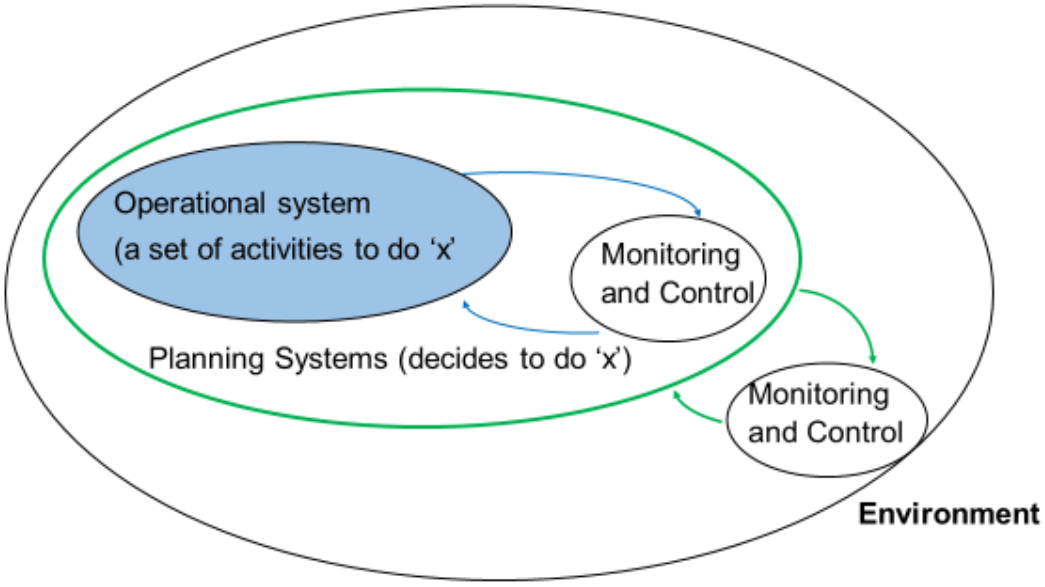

Figure 2: Monitoring and Controlling a System (From Checkland 1986)

3.4 Assessing the performance of Stakeholder's network: a Soft Systems Methodology (SSM) Model

SSM and the transformation process

The concept and the different views around issues pertaining to stakeholders' network involvement in HEIs were described using Checkland's Transformation Process. The following is a partial list of how the role of a stakeholders' network is viewed by different members of the network:

1) A way of exercising HEI staff concerns about SD implementation in HEIs
2) A way of preparing students to become more aware of the value of SDGs.
3) A way of exercising pressure on HEI Senior management to be more active in pursuing SD in HEIs
4) A way of creating and consolidating a SDGs culture in HEIs.

If we use Checkland's model on the third of the above views, we can apply the following control and monitoring concepts to this situation:

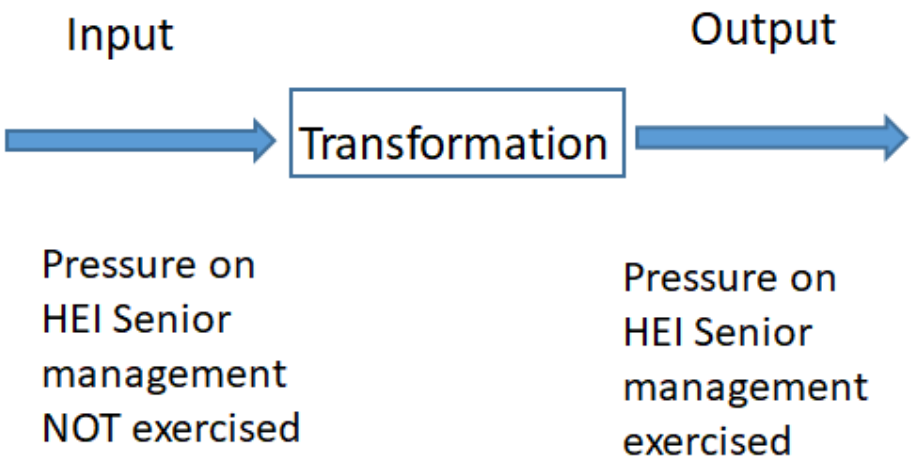

Figure 3: Input and output in a transformation process.

In Figure 3, we have as input: "pressure on HEI Senior management not exercised" and as an output the same kind of input but in a transformed state: "pressure on HEI Senior management exercised", this according to SSM is an important distinction and the right way of stating i/o in systems language (as opposed to say input as 'resources', i.e.: material, money, etc and as an output: 'result product) SSM insists that the output is just the input but in a transformed state. So, in the diagram above, to successfully manage this process we should ask the following questions:

1) Do the means selected to do **T** work? In other words does the strategic plan allow the creation of a strong research culture– The answer will be a measure of **Efficacy** of **T**.
2) Is **T** being done with minimum resources (including time)? – This is relatively easy to measure (cost associated to the consolidation of a research culture). This answer measures the **Efficiency** of **T**.
3) Is **T** the right thing to be doing? Here we need to question the need for a stakeholder network involvement in HEI in the first place. This question can be asked only if we move to the upper level, that is to the planning system. At this level, the planning system, may decide to have a 'strategic plan' and indeed to question involvement in the first place; the planning system of this notional systems could decide to do 'y' instead of 'x' (to move the pressure to government agencies rather than HEI senior management). The answer will be a measure of the **Effectiveness** of the **system**.

Stakeholder networks' involvement in HEIs is a complex situation and we argue that systems thinking helps to clarify the situation and make sense of the elements and its connections in this situation. Figure 4 is an attempt to clarify the role of stakeholder networks and how the role and performance can be assessed using CATWOE analysis tools from soft system methodology.

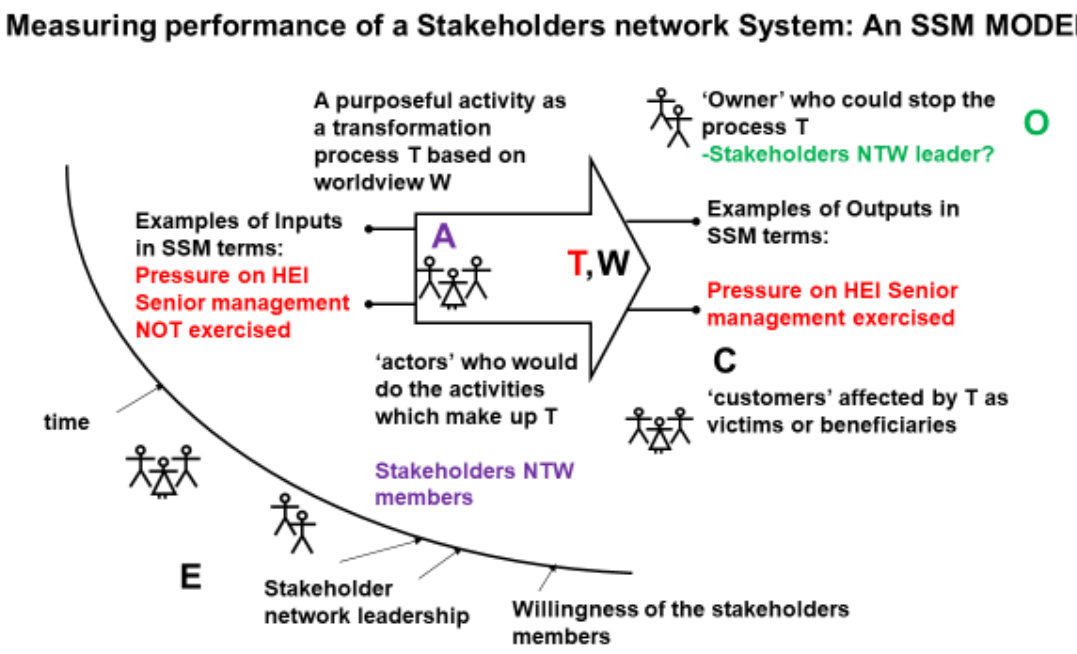

Figure 4. Measuring stakeholder network involvement and performance: an SSM model (adapted from Checkland and Poulter, 2006)

4. Conclusions

Applied to the transformational challenges we currently face, the SDGs attempt to use both hard and soft systems, in that the planetary crises are atomised into seventeen parts, while the seventeenth SDG recognises the need for holistic systems thinking to make sense of all the other SDGs as a whole. '… (K)nowing, is at the same time separating and connecting, it is to make analysis and synthesis. Both are inseparable…' (Morin 2007: 25). However, most HEIs represent a reductionist structure in their disciplinary separation and hierarchical organisation by faculties, departments, courses and management. Hence the popular view that academia is far removed from the 'real world', but it doesn't have to be this way:

'Accordingly, systems thinking does not concentrate on basic building-blocks but rather on basic principles of organisation. Systems thinking is 'contextual', which is the opposite of analytical thinking. Analysis means taking something apart in order to understand it; systems thinking means putting it into the context of a larger whole.' (Capra 1996: 29)

Perhaps, HEI engagement with a truly integrated stakeholder network could provide the necessary meta-function to unify the units within universities, to become whole systems - similar in structure to multi-cellular life forms (ourselves included), whereby a number of organs, flows and processes operate within a semi-closed system, far from equilibrium. At a different scale, ecosystems display similar structural patterns.

> 'The ecosystem concept – defined today as 'a community of organisms and their physical environment interacting as an ecological unit' – shaped all subsequent ecological thinking and, by its very name, fostered a systems approach to ecology' (Lincoln et al. in Capra 1996: 33).

In addition to asking how may a stakeholder networks support universities to deliver the SDGs, we may turn the question round to ask how may universities support other stakeholders in this task? Better still, perhaps we should consider how they may support each other, as a sustainable living network. Here the word 'development' has been deliberately dropped and replaced with

'living', as the word development assumes the perpetuation of neoliberal capitalism as a means of addressing the transformative challenges we face. Many would argue that this assumption renders SD to be an oxymoron (Haley 2017) and furthermore, to be linked to the social and environmental crises that have become the climate emergency, species extinction and ecological collapse (Klein 2018; Kahn 2010; Haley 2020: 4).

Given the dominant neoliberal economic context, therefore, how may HEIs find stakeholders to support sustainable living beyond development? Climate emergency declarations (Climate Emergency Declaration 2020) by universities, local government authorities and corporations have in many cases become a double-bind for these institutions (Haley 2017), as their good intentions to support the SDGs are compromised by a political-economic culture that compromises and confounds the situation (Meadows 1999). Indeed, some corporations, national and international bodies that are unable to break the western paradigm, maintain that 'sustainable growth' (Inc.) is the only solution, while others like BP (BP 2020a; Storrow 2020) make unbelievable and unsubstantiated claims to relinquish their carbon industrial interests. The cynicism of such powerful potential stakeholders, the financiers of the majority of UK research funding (BP 2020b), makes things very difficult for universities and other educational institutions (including schools, academies, FE colleges and research centres) to shift from unsustainable networks to sustainable networks.

From a university perspective, much Environmental Education has already been appropriated, as Richard Kahn puts it;

> '… this laudatory praise of its environmental literacy program by environmental educators is little more than the present-day technocratic standards movement in education masquerading as a noteworthy "green" improvement. Put bluntly: this environmental literacy as a greenwash' (Kahn 2010: 9).

'(C)hanging is difficult, but it is always possible' (Freire 2016), so maybe we should consider alternative systems for sustainable futures? Such foresight scenarios for the development of higher education stakeholder networks, for and beyond the implementation of sustainable development, may include:

a) New Radical stakeholder networks

Despite the pressures of the powers that be, since the emergence of Extinction Rebellion (XR) (BBC 2019), UK universities are facing a far deeper and more united call from their students and staff to change to be socially and environmentally accountable. While students have in the past demanded such ethical and moral alignment from their HEIs, over issues like fracking (People & Planet n.d.) and carbon industry divestment (Taylor 2020; Wootton-Cane 2019), the persistence of XR reveals a potential learner stakeholder with real interest in their futures, the students.

Considering the structure, pattern and processes of an HEI(s), how may stakeholders contribute to its development of sustainable living? (This could be plural, as this then raises the question of how autonomous is each HEI is and what impact might they have individually and collectively - i.e. stacked systems)

b) Co-learning as the basis action underpinning stakeholders networks

Co-learning or collaborative learning could form the basis of stakeholder networks. The idea is akin to the concept of 'post-disciplinarity', developed by ecological artists, Helen Mayer Harrison and Newton Harrison in 2008 (Haley 2012). This form of cooperative governance starts with the image of all the disciplines seated at a circular table; no one discipline has dominance over any other – they must all listen to each other. Climate change, species extinction, ecological collapse and poverty are then placed at the centre of the table for all to address, equally. Of course, this profoundly simple system owes much to John Dewey (2015:

19) and Deluze and Guttari (2013: 3), and it has been extended and expanded to include non-colonial, feminist, pro-LGBT+ and other inclusive forms of teaching and learning that go beyond educational institutions to society at large and back to the original Ancient Athenian concept of 'paidiea' (Kahn 2010: 40). For Paulo Freire and Richard Kahn, this is the essential starting point of critical pedagogy for genuine societal transformation that could actually bring about sustainable living through 'ecopedagogy' (Kahn 2010:1; Haley 2009: 306). Here, Ecoliteracy (Capra 1996) takes precedence over fiscal, commercial and industrial development and the cognitive dissonance of the international community's disingenuous response to the collective global crises (Anderson 2015).

"The question is not only ethical in the conventional sense, it is also an ecological question. The means by which one man influences another are a part of the ecology of ideas in their relationship, and part of the larger ecological system within which that relationship exists." (Bateson, 2000: 512).

c) Eco-pedagogy as the base for resilient network stakeholders

Let us then consider what an ecopedagogical network for sustainable living might look like, how such a network or system might operate and who the stakeholders might be. Well, who could possibly be left out of such a network and why? For the purposes of practicality, let us consider including just the representatives of organisations, that way we may create a network of networks, enabling direct and meaningful communication to many more people; a social ecosystem, as opposed to PR and advertising that lack personal interconnectivity and the potential for criticality. Favouring no stakeholders, the form could be rhizomatic (Deluze and Guttari 2013: 3). Like bamboo or ginger, the pattern of growth is on a horizontal plane, with sub-groups (nodes) that send out rootstalks. It is the mass of roots that are the network, the ecology, or 'the pattern that connects' (Bateson 2000: 7). There is no hierarchy and just one aim; to promote sustainable living through ecological literacy. This is the modus operandi – structure, pattern, process and intention as one entity. HEIs would simply be an integral, interconnected, interdependent stakeholder of stakeholders.

Some may recognise the potential for the emergent system of Transdisciplinary Knowledge, a process or method that goes '... at once between the disciplines, across the different disciplines, and beyond all disciplines' (Nicolescu 2008: 2). Here the potential for creative regeneration (Wahl 2016) may be able to design sustainable living futures that incorporate social, cultural, environmental and political conservation, regeneration and reinvention in a non-deterministic fashion. This path to self-determination and self-reliance through ecopedagogy has the potential to cast aside fatalistic attitudes of 'that's how things are', or 'that's human nature' (Freire 2016: 79). Indeed, seen as a self-supporting system of sustainable living, this network of stakeholders would become ecologically resilient (Gunderson and Holling 2002: 28), by virtue of its flexible capacity to withstand impacts and adaptive capabilities to emerge from a state of collapse to another state of becoming.

Finally, as we become increasingly cognisant of the global ecological crisis, we may reflect on the etymological root of the word, crisis. From the Greek verb krinein, it means "to decide"; however in Chinese, the equivalent ideogram for crisis – wei-ji– is formed of the two characters for 'danger' and 'opportunity' (Kahn 2010: 4), While sustainability paradoxes persist and corporate interests dominate our society, opportunities emerge for transformation, or organisational change at a greater scale of magnitude. 'It means the necessity of the introduction of a new order of conceptions leading to new modes of practice' (Dewey 2015: 5). The efficacy, efficiency and effectiveness of stakeholder networks then shifts to a different set of values, as the cultivation of an ecopedagogical stakeholder network could become the primary role for universities intent on sustainable living. Again, as Paulo Freire wrote; 'changing is difficult, but it is always possible'.

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