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Sustainable development stakeholder networks for organisational change in higher education institutions: A case study from the UK

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ABSTRACT

Progressing towards sustainable development remains a key global challenge. And yet, the various interpretations of the concept of sustainable development and the questions it raises about economic growth make its implementation difficult. Higher education institutions may help to overcome these difficulties by developing new processes of change. However, to achieve this they need to integrate sustainable development in all their areas of activity. The aim of this paper was to develop new insights into organisational change processes in universities relating to sustainable development. Contributing to this aim, this paper reports on a case study of United Kingdom higher education drawing on findings and conclusions from a survey of their policy frameworks relating to sustainable development. The method comprised a critical policy analysis in order to identify, differentiate and categorise stakeholder interactions. The data generated comprised the range of higher education stakeholders and the network of interactions that they formed. Theoretical insights from social network analysis, stakeholder theory and the normative business model were used to find opportunities to address the difficulties in the implementation of sustainable development. Results suggested that the existing networks identified in the policy frameworks may not support the effective integration of sustainable development in higher education. Low-density of the national networks; the lack of a clear governance vocabulary for national policy frameworks; and the lack of explicit funding flows between organisations all pose problems for organisational change towards sustainable development in higher education.

1. Introduction

Progressing towards sustainable development remains a key global challenge (United Nations, 2016; Holden et al., 2016). Sustainable development is a development model that integrates environmental, social and economic considerations (WCED, 1987). The various interpretations of the concept of sustainable development (Bonnett, 2002, 1999; Stables and Scott, 1999; Haque, 2000; Holt and Barkemeyer, 2012; Fischer et al., 2017), and the questions it raises about economic growth (Baker, 1997; Bosselmann, 2001), make its implementation difficult. Despite the difficulties in progressing towards sustainable development, policymakers at national and international levels have widely adopted the term (Estes, 1993; Baker, 1997; UN, 2015). So, how could the difficulties in implementing sustainable development be overcome and who are the actors that could help overcome these difficulties?

Higher education institutions are one of the actors that may help to overcome these difficulties by developing new processes of change (Cortese, 2003). Different business models could lead to different transformational change in institutions (Demil and Lecocq, 2010). The Normative Business Model could explain the implementation of sustainable development in organisations (Randles and Laasch, 2016). The Normative Business Model brings together financial, governance, agency, normativity and institutionalisation issues in explaining how organisations embed sustainable development practices (Randles and Laasch, 2016). Normativity refers to assigning social values to desirable or appropriate actions (Randles and Laasch, 2016). Institutionalisation

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refers to social values becoming part of the organisational norms (Randles and Laasch, 2016). Randles and Laasch (2016) suggested that financial concerns, as well as governance issues, may be critical factors in understanding how organisations embed sustainable development practices. However, there is a dearth of studies focusing on these issues in relation to the implementation of sustainable development in higher education (Stephens and Graham, 2010). So, the role of financial and governance issues in implementing sustainable development in organisations and particularly in higher education institutions needs further research.

Local and national stakeholders influence higher education institutions (Radinger-Peer and Pflitsch, 2017). In addition, higher education institutions depend on their local and national stakeholders (Radinger-Peer and Pflitsch, 2017). Stakeholder theory has been criticised for been descriptive and lacking elements of predictability (Donaldson and Preston, 1995; Jones, 1995; Mitchell et al., 1997; Rowley, 1997; Wood, 1991; Key, 1999). However, it may facilitate identifying and recognising the importance of direct and indirect links between organisations (Key, 1999). Brusca et al. (2018) have applied stakeholder theory (Freeman, 2010) to understand processes of change towards sustainable development at higher education institutions. Brusca et al. suggested that internal and external stakeholders are drivers for organisational change if the appropriate channels for participation are in place and leadership is supportive of these. For instance, stakeholder participation is relevant for advancing sustainable development reporting at universities (Brusca et al., 2018; Ceulemans et al., 2015). Therefore, using stakeholder theory could help understand the influence of external stakeholders through their links in relation to higher education organisational change towards sustainable development.

Social network analysis includes identifying, differentiating and categorising stakeholders and the relationships between them (Provan and Kenis, 2008; Reed, 2008). It has been suggested that planning is a precondition for long-term and thriving sustainable development initiatives in higher education (Leal Filho et al., 2018). Policy frameworks are constructs that provide direction for processes of change and planning. Implementation of policy frameworks refers to putting into effect the information included in them (Newig and Koontz, 2014). Since policy frameworks often identify key stakeholders and their interactions, social network analysis could be used to identify higher education stakeholder networks. Such normative identification of stakeholder networks may reveal important insights into how organisations change due to external stakeholder pressures.

In reviewing the literature, there is a lack of a cohesive theoretical underpinning for implementing sustainable development at higher education institutions (Stephens and Graham, 2010; Figueiró and Raufflet, 2015). Combining social network analysis and stakeholder theory in the context of organisational change could help address this lack of theoretical underpinning. This theoretical underpinning will be valuable in the context of sustainable development at universities for the following reason. Stakeholder participation is central to systemic change (Radinger-Peer and Pflitsch, 2017), which could help address difficulties in the systemic implementation of sustainable development. In addition, the normative business model (Randles and Laasch, 2016) may provide opportunities for the theoretical and practical understanding of how organisations embed sustainable development in their practices. Therefore, linking stakeholder theory, social network analysis and the normative business model can help develop new theoretical insights into the difficulties in the implementation of sustainable development.

A question becomes apparent. What is the role and implications of stakeholder participation in the context of universities' organisational change towards sustainable development? The following section provides an overview of the state of the art in relation to this question.

2. Organisational change for sustainable development at higher education institutions

Higher education institutions have multilevel and complex structures (Arbo and Benneworth, 2007; Denman, 2009). Higher education institutions include groups or individuals who engage with external stakeholders to support regional transition paths to sustainable development (Radinger-Peer and Pflitsch, 2017). Radinger-Peer and Pflitsch suggested that the dynamics of interaction between staff and external stakeholders depend on their activity (e.g. teaching, research, outreach) (2017). When doing research, staff are engaged with the national and international aspects of the change processes (Radinger-Peer and Pflitsch, 2017). Whereas teaching and outreach provide the opportunity to support sustainable development at local level (Radinger-Peer and Pflitsch, 2017). Academics' participation in international conferences is crucial to building links between knowledge at international level and practice at local level (Berchin et al., 2018). Linking the different areas of universities' activity connects the international and the local level (Radinger-Peer and Pflitsch, 2017). Success factors in the implementation of sustainable development at local level include interaction between stakeholders with different areas or levels of expertise in and outside academia (Bebbington et al., 2017). This in turn, supports the transition paths to sustainable development by multilevel bridging (Radinger-Peer and Pflitsch, 2017). Therefore, stakeholder participation in the context of higher education is crucial in bridging theory and practice at the interface of different levels (i.e. international and local).

External stakeholder pressures drive organisational change in higher education (Radinger-Peer and Pflitsch, 2017). Universities are responsive to the influence of external stakeholders (Radinger-Peer and Pflitsch, 2017). But, the degree of control over organisational change is greater for internal changes than for external pressures (Lozano, 2013). External factors are critical to the implementation of sustainable development in higher education institutions (Blanco-Portela et al., 2017). Barriers to change at universities due to external factors include lack of commitment of external stakeholder and stagnation of government progress towards sustainable development (Lidgren et al., 2006; Franz-Balsen and Heinrichs, 2017; Ferrer-Balas et al., 2008; Corcoran and Chacko Koshy, 2010; Wright, 2010; Djordjevic and Cotton., 2011; Krizek et al., 2012; Ralph and Stubbs, 2014; Fernandez-Manzanal et al., 2015). Drivers of change due to external factors include pressure from peer institutions and from other external actors, and financing programs to support sustainable development in higher education (Sammalisto & Arvidsson, K., 2005; Ferrer-Balas et al., 2008; Ferrer-Balas et al., 2009; Lee et al., 2013; Wright and Horst, 2013). Academic conferences that include engagement with external stakeholders are opportunities for knowledge exchange that help to influence organisational change in higher education institutions regarding sustainable development (Berchin et al., 2018). External pressure is critical when local stakeholders' actions for sustainable development are supported by national policies (Cooper et al., 2014). Therefore, minimising external barriers supported by national policy frameworks create new opportunities for universities' to achieve organisational change towards sustainable development.

Participatory approaches have risks and benefits (Disterheft et al., 2015). Critical success factors in participatory approaches are related to structure, process and people and their interconnections (Disterheft et al., 2015). However, external stakeholder participation is rarely considered in assessment (Disterheft

et al., 2012; Saadatian et al., 2013) and reporting (Disterheft et al., 2014; Ceulemans et al., 2015) of sustainable development in higher education. The influence of external stakeholders on change processes and reporting for sustainable development has not yet been studied empirically (Ceulemans et al., 2015). Although external stakeholder participation is a key feature of quality assurance of reporting in companies, higher education institutions are not often engaged in these processes (Fonseca et al., 2011) The absence of external stakeholder participation hinders the change process (Ceulemans et al., 2015). However, ISO 14001:2015 includes external stakeholder participation (ISO, 2015) and universities willing to gain the standard would need to engage with this activity. In addition, stakeholder participation and partnerships are central to capacity building and knowledge co-creation that drive institutionalisation and systemic change when addressing complex challenges (Glasbergen, 2007). One of the reasons for this is that strategic aims are better developed and implemented with the use of the collective intelligence of internal and external stakeholder (Secundo et al., 2016). Also, the development of universities' third mission (i.e. regional development and social engagement) requires stakeholder participation (Secundo et al., 2016). Therefore, external stakeholder participation is crucial for organisational change towards sustainable development in higher education institutions.

Two questions become apparent. First, who are universities' external stakeholders and what are their apparent interactions in relevant national policy frameworks? Second, could the stakeholder interactions identified in relevant policy frameworks, support organisational change in higher education?

The aim of this paper was to develop new insights into organisational change processes in universities relating to sustainable development. To further this aim, a case study of United Kingdom higher education was undertaken comprising a survey of the policy frameworks of the constituent UK countries (England and Northern Ireland, Scotland and Wales) relating to sustainable development. In order to identify, differentiate and categorise stakeholder interactions the method used was critical policy analysis. The range of higher education stakeholders and the network of interactions which they formed, comprised the data generated. The data was used to find opportunities to address the difficulties in the implementation of sustainable development. Social network analysis, stakeholder theory and the normative business model were used to theoretically underpin the synthesis and interpretation.

3. Methods

The research design was a case study of United Kingdom higher education sustainable development policy. The case study comprised a survey of the policy frameworks that the case study countries had in place for implementing sustainable development. The analytical techniques were coding, stakeholder centrality and network density measures focussed at highlighting areas for policy development and implementation (Yanow, 2000).

The United Kingdom was chosen because it has a very mature and internationally renowned system which should be more developed than other countries (Sterling and Scott, 2008). First, seven selection criteria were developed to select the policy frameworks for analysis. The policy frameworks that were analysed had to meet all seven selection criteria i.e. United Kingdom scope, focussed on the higher education sector, spanning across disciplines, apply to whole institutions, covering all areas of universities' activities, being active since the end of the decade of education for sustainable development, and finally being publicly available (Table 1).

The decade of education for sustainable development was declared by the United Nations to promote education for sustainable development across the world (United Nations, 2002). After the decade's efforts, a rise in sustainable development activity with a focus on education would be expected. Therefore, using the end of the decade as a starting point for the sampling was an appropriate choice. This choice may also provide a fertile basis as requested by the Aichi-Nagoya Declaration (United Nations, 2014a,b) and supporting the Global Action Plan (GAP) (United Nations, 2014b) on education for sustainable development for the 2030 agenda.

Table 1
Sampling criteria for policy frameworks included in the survey.

Policy framework (year)	NA	PA	PF	CD	WI	AA	TS
Wales (2008)	1	1	1	1	1	1	1
England (2008)	1	1	1	1	1	1	1
England (2014)	1	1	1	1	1	1	1
Scotland (2010)	1	1	1	1	1	1	1
Scotland (2013)	1	1	1	1	1	1	1
Procurement	1	1	1	0	0	0	1
Total	6	6	6	5	5	5	6

Notes 1: present; 0: absent; (a); NA: national scope; PA: publicly available; PF: policy focused on higher education; CD: cross-disciplinary policy; WI: whole institution policy; AA: sustainable development policy addressing all areas of university activity; TS: within the sampling time scale: January 2015–December 2017.

The policy frameworks were collected between 26 April 2016 and 15 August 2017. The United Kingdom regional governments and their funding councils up to these dates regulate and manage funding for higher education at national level. First, the webpages of the regional governments and their funding councils were identified as the suitable sources of the policy frameworks (i.e. Wales, Scotland, Northern Ireland, England; and Higher Education Funding for England, Higher Education Funding for Wales, Scottish Funding Council).

Second, a keyword search was undertaken on the source websites (i.e. www.hefce.ac.uk, www.hefce.ac.uk, www.sfc.ac.uk, www.gov.scot/, www.gov.uk/, http://gov.wales, www.northernireland.gov.uk). The keywords used were "sustainable development" or "sustainability" and "higher education" or "universities", or "education for sustainable development", and their root words (i.e. sust*, develop*, universit*).

The policy frameworks that met all the selection criteria were Education for Sustainable Development and Global Citizenship A Strategy for Action (Welsh Assembly, 2008), Learning for change: Scotland's action plan for the second half of the UN decade of education for sustainable development (The Scottish Government, 2010), Learning for Sustainability Scotland (RCE, 2013), Sustainable Development in higher education (HEFCE, 2008 and 2014). These documents were analysed in order to identify, differentiate and categorise stakeholders and their relationships.

The policy frameworks were analysed by an inductive coding approach in NVIVO 10 that included four stages. Units of analysis were created by assigning codes to data (Lincoln and Guba, 1985). First, open coding was developed using words found within the text that gave a name to the first codes (e.g. network of organisations). Second, selective coding involved merging similar codes into sub-themes, giving them the name that was chosen as the most appropriate. During the second stage, codes were changed several times, to avoid possible overlaps until a distilled version of the subthemes was created. In the third stage, subthemes were merged into themes. Finally, theoretical coding involved identifying relationships between codes, which had an action and a direction (e.g. x reports to y).

Throughout the different stages relationships between stakeholders were recorded when statements like stakeholder x 'funds', 'works with', 'reports to', stakeholder y were made. Sometimes

parts of the policy frameworks were written in a way that made it difficult to draw clear relationships between the stakeholders. For example, the policy framework for Wales (Welsh Assembly Government, 2008) uses the passive voice. When the stakeholders involved in an interaction were not explicitly mentioned in the policy frameworks, the interaction was not recorded in order to avoid misinterpretations. The stakeholders and their relationships were visualised in network diagrams using Vue and Publisher software.

The density of the network and the closeness centrality of key stakeholders were used as analytical measures of the networks. The density is the ratio of actual connections over the potential connections in a network (Scott and Carrington, 2014). The density ratio (D) was obtained with the equation (1):

$$D = \frac{x}{\frac{n(n-1)}{2}} \times 100 \quad (1)$$

where n is the total number of stakeholders in the network and x is the actual number of connections (i.e. relationships) between the stakeholders recorded.

The benchmarked scale of density goes from 0% to 100%. For instance, if there are 2 organisations with no connections between them the network would have a density of 0% whereas 2 organisations with the maximum connections possible between them (i.e. 1) would have a density of 100%.

As the maximum density of a network is difficult to achieve and the results for density were close to each other the results were benchmarked against the highest and lowest densities.

Different measures of centrality include degree centrality, closeness centrality, and betweenness centrality (Degenne and Forse, 1999). Centrality is the actual number of direct connections that one stakeholder has with other stakeholders in the network (Rowley, 1997). Closeness centrality was used because it was the most relevant for the results found in the coding analysis that showed the links between each stakeholder in relation to the rest of the network. The closeness centrality ratio (C) was obtained with equation (2):

$$C = \frac{a}{n-1} \times 100 \quad (2)$$

where n is the total number of stakeholders in the network and a is the actual number of direct connections from one organisation to each of the other organisations. Different types of connections between the same organisations were only counted once.

The scale of closeness centrality ranges from 0% to 100%. For instance, if one organisation within a network of three organisations has no direct connections to other stakeholders in the network the closeness centrality of the organisation is 0%. If one organisation in a network of three organisations has two direct connections to the other organisations within the network, the closeness centrality of the organisation would be 100%.

For both centrality and density, the highest closeness centrality result was used as the 100% benchmark to which other centralities were benchmarked. The tertiles of closeness centrality were calculated. Low was defined as 0–33%, medium 34%–66% and high 67%–100%.

4. Results

4.1. Stakeholder participation and influence

The policy framework for England and Northern Ireland identify organisations such as the Joint Information Systems Committee, universities finance directors' group and director of estates association (Fig. 1, Table 2). In contrast, the policy frameworks for Wales and for Scotland do not mention these organisations and tend to focus on others concerned with teaching and learning issues, such as teacher training institutions (Figs. 2 and 3 and Table 2). A reason for this might be the devolved administrations for each of UK's constituent countries in terms of education policy. Devolution has resulted in different structures and procedures for higher education in each country (Bache and Flinders, 2004). The institutional processes of change could be influenced by organisations involved in the network (Reed, 2008).

Scotland had a more dense network (D = 11.8%), than Wales (D = 8.2%) and England (D = 7.3%; Table 3). Dense networks tend to promote shared values (Meyer and Rowan, 1977). Therefore, low-density networks may indicate lack of shared values in the integration of sustainable development.

Both density and closeness centrality tend to predict the influence of organisations in a network (Rowley, 1997). The closeness centrality of the government was higher in Scotland (C = 41.2% and CB = 62.7%) than it was in Wales (C = 33.3% and CB = 50.7%) and in England (C = 5.7% and CB = 8.7%; Table 4). Highest centrality score means highest influence. The difference in key organisations' closeness centrality in policy frameworks could be due to the differences in the higher education structures for each country.

4.2. Governance at network level

Table 2b has stakeholder interactions that could be related to governance activity. These interactions include monitoring, reporting, assessing and reviewing (Table 2b). In England, all these interactions link back to the universities' funding body (Fig. 1). Whereas in Scotland the majority (3 out of 4) of these interactions (i.e. monitoring, reporting and assessing and reviewing) link back to the government (Fig. 2). The policy frameworks suggest that there is focus on the universities' funding bodies (Fig. 1). These interactions tend to form few bilateral links between two stakeholders rather than forming a clear pattern that suggests organised

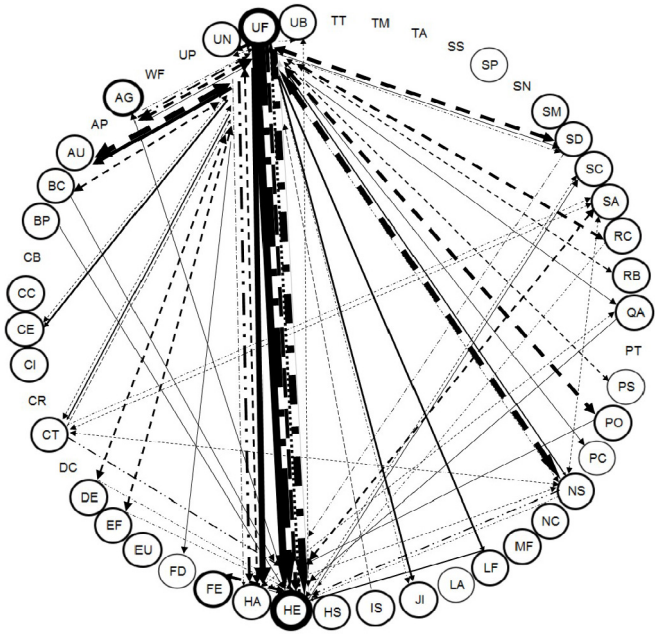

Fig. 1. Network diagram of higher education stakeholders and their interactions in the policy framework for England and Northern Ireland (abbreviations and legend in Table 2).

Table 2
Legend for Figs. 1–3.

Abrev.	Stakeholder organisation
a) Stakeholder organisations and their abbreviations used in the network diagrams.	
AG	government
AP	public sector auditor
AU	association of universities
BC	Business in the Community
BP	business partners
CB	capacity building centre
CC	city council
CE	Regional Centre of Expertise
CI	Confederation of British Industry
CR	charity regulation organisation
CT	Carbon Trust
DC	Sustainable Development Commission
DE	director of estates association
EF	energy efficiency finance association
EU	European Union
FD	universities finance directors group
FE	further education institutions
HA	Higher Education Academy
HE	higher education institutions
HS	higher education statistics agency
IS	International Standard Organisation
JI	Joint Information Systems Committee
LA	local authority
LF	Leadership Foundation for Higher Education
MF	European Foundation for Quality Management
NC	UK National Commission for UNESCO
NS	national student association
PC	Intergovernmental Panel on Climate Change
PO	association of procurement officers
PS	professional and statutory bodies
PT	Professional body of teacher education institutions
QA	quality assurance body
RB	regional bodies
RC	research councils
SA	student association
SC	schools
SD	sustainable development association of universities
SM	Space Management Group
SN	education for sustainable development network
SP	Centre for Sustainable Procurement
SS	Alliance of Sector Skills Councils
TA	Teaching Academy
TM	Third Mission Committee
TT	teacher training institutions
UB	National Centre for Universities and Business
UF	universities funding body
UN	United Nations
UP	Universities Purchasing Consortium
WF	World Wide Fund for Nature
b) Arrows representing stakeholders' interactions, circles and arrows' thickness representing number of times a stakeholder for the former and an interaction for the latter, is mentioned in the policy frameworks for the United Kingdom.	
	Monitors
	Reports
	Works with
	Provides funding
	Assess/reviews
	Requests work or to provide funding to others
	Encourages
	Supports
	Responds
	Hosts
	≤200
	110–199
	61–110
	21–60
	2–20
	1
	0
	≥10
	7–9
	5–6
	4
	3
	2
	1

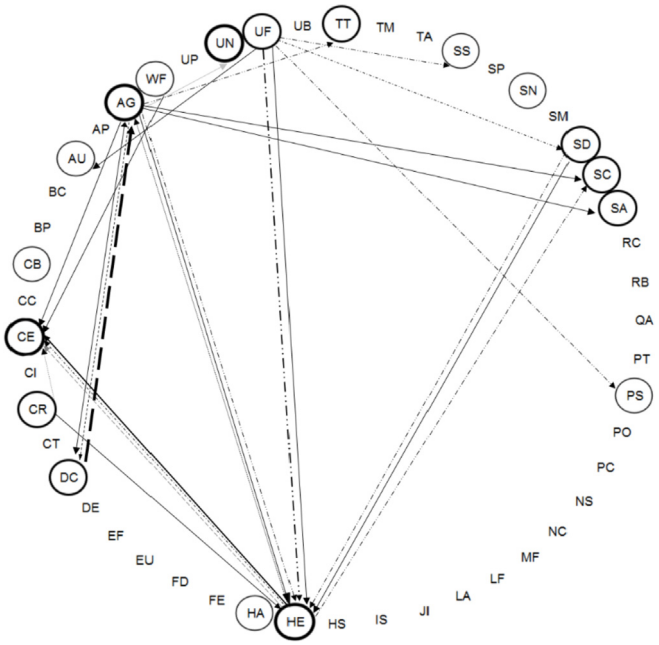

Fig. 2. Network diagram of higher education stakeholders and their interactions in the policy framework for Scotland (abbreviations and legend in Table 2).

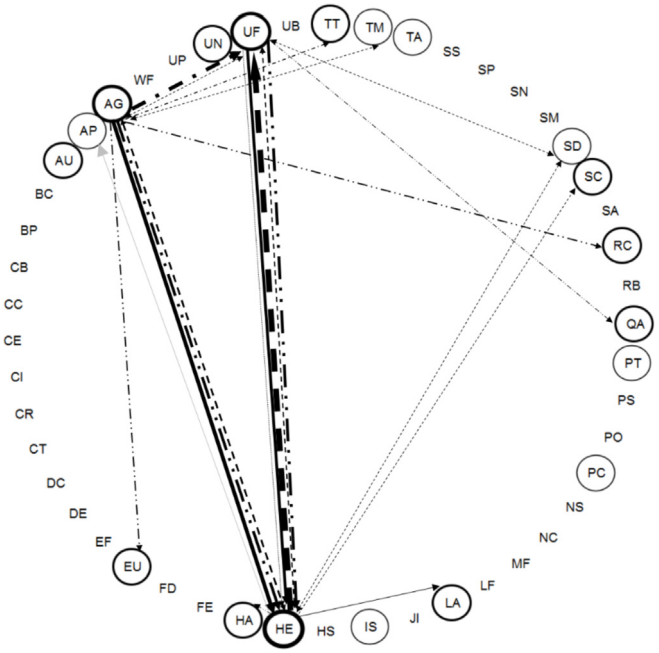

Fig. 3. Network diagram of higher education stakeholders and their interactions in the policy framework for Wales (abbreviations and legend in Table 2).

governance at network level (Figs. 1–3). In addition, neither of the policy frameworks studied include interactions like co-ordinating, leading or organising (Table 2b). The lack of interactions related to network governance might be due to a low level of legitimacy for one or a group of stakeholders to control the whole network. However, a form of governance may be needed for continuous evaluation processes (Clarke and Fuller, 2010), and for institutionalisation (Randles and Laasch, 2016) of sustainable development.

One of the variables for the prediction of network governance effectiveness is the number of stakeholders involved (Provan and

Table 3
Network density and number of connections between stakeholders for the policy frameworks.

	n	x	PC	D %	DB%	LMH
Wales	19	14	171	8.2	20	low
England	36	46	630	7.3	0	low
Scotland	18	18	153	11.8	100	high

Notes (n) number of stakeholders; (x): actual number of connections between stakeholders; (PC): potential number of connections between stakeholders; (D): density of the stakeholder network, (DB): density benchmarked, (LMH): Low-medium-high scale.

Table 4
Stakeholder closeness centrality.

	A	C%	CB%	LMH
HE ^{w}	7	38.9	59.2	med
AG ^{w}	6	33.3	50.7	med
UF ^{w}	4	22.2	33.8	med
HE ^{e}	15	42.9	65	high
AG ^{e}	2	5.7	8.7	low
UF ^{e}	23	65.7	100	high
HE ^{s}	6	35.2	53.6	med
AG ^{s}	7	41.2	62.7	med
UF ^{s}	5	29.4	44.7	med

Notes (A): actual number of connections between key stakeholders and all the other stakeholders, (C): closeness centrality of key stakeholders in the network, (w): Wales, (e): England, (s): Scotland, (HE): Higher Education Institutions, (AG): government, (UF): universities funding body, (CB): centrality benchmarked, (LMH): Low-medium-high scale.

Kenis, 2008). Networks with low numbers of stakeholders tend to work effectively through shared governance (Provan and Kenis, 2008). The relatively small number of stakeholders in the network for Scotland (n = 18, Fig. 2 and Table 2) and Wales (n = 19, Fig. 3 and Table 2) suggest that shared governance could be an effective model for Wales and Scotland.

4.3. Financial model at network level

Only in England does the policy framework show an interaction in which the universities' funding body provides funding to the higher education institutions (Figs. 1–3). Whereas only the Welsh policy framework shows an interaction suggesting that the government provides funding to the universities' funding body and the teaching training institutions (Figs. 1–3). The lack of funding interactions at network level (i.e. not only between two institutions) (Figs. 1–3) could be due to lack of funding for network level activity to address sustainable development. Another reason could be that the policy frameworks do not include the funding flows although they exist in practice. Either way, a financial model is critical to the institutionalisation process (Randles and Laasch, 2016). A lack of funding allocation at network level could have negative consequences in terms of how effective the process of integration of sustainable development in higher education is.

5. Discussion

5.1. Stakeholder participation and influence

The stakeholders mentioned in the policy frameworks for England and Northern Ireland cover information technology, research, teaching and learning (Table 2). Each stakeholder has the potential to affect different departments and activities at universities, which in turn may support a process of deep institutionalisation (Randles and Laasch, 2016). Deep institutionalisation may indicate that the process of change in an organisation has not stayed at the superficial level. In the Welsh and Scottish policy frameworks, the range of stakeholders is limited (Figs. 2 and 3). A limited range of stakeholders may indicate the missed potential for a whole institution approach to embedding sustainable development. On the other hand, the focus on teaching and learning stakeholders (e.g. teacher training institutions), in the Welsh and Scottish policy frameworks (Figs. 2 and 3), may indicate the potential for embedding education for sustainable development in the curriculum.

The inclusion or exclusion of stakeholders in the policy frameworks is important. The reasons for stakeholder inclusion or exclusion, and the outcomes of their interactions are central to organisational change outcomes (Adams and McNicholas, 2007). Stakeholder participation can improve decisions. However, participation depends on the clarity of policy objectives and their coherence with delivery methods and facilitation (Reed, 2008). Furthermore, stakeholder participation has implications for the change outcomes at network level (Reed, 2008). Although, the Welsh and Scottish policy framework mention the Higher Education Academy, they only state one interaction with it (i.e. Higher Education Academy and higher education institutions in Wales; Figs. 2 and 3). On the contrary the Higher Education Academy is a key stakeholder in England and Northern Ireland (Fig. 1). The Academy works with the quality assurance body and supports the higher education institutions (Fig. 1). The funding body supports, works with, encourages and requests work from the Higher Education Academy (Fig. 1). The influence of excluded or low interaction stakeholders could be missed (Frooman, 1999). Therefore, in order to support the integration of sustainable development, it is important to identify stakeholders through both bottom up and top down approaches supported by a facilitated process based on clear objectives.

There is an increasing tendency for policy frameworks at national and international levels to emphasise partnership work (Younge and Fowkes, 2003). There are twenty three interactions that might be related to partnership work (i.e. works with) in England and Northern Ireland, six in Wales, and none in Scotland (Figs. 1–3). Stakeholder participation is an institutionalised practice in policy formulation (Reed, 2008). Stakeholder participation can lead to effectiveness in policy implementation (Kenis and Schneider, 1991; Baker et al., 1997). In addition, consolidating stakeholders' knowledge improves effectiveness in policy and practice (Stringer and Reed, 2007). Therefore, stakeholder participation in decision making, policy formulation and implementation could be further acknowledged in the policy frameworks.

A network's high density reflects the potential of shared values, norms and good communication amongst the stakeholders (Meyer and Rowan, 1977; Shani et al., 2008). Shared values, norms and good communication are necessary characteristics of networks relating to sustainable development (Hemmati, 2002). However, the density in Wales, England and Northern Ireland is low compared to the density suggested by the Scottish policy framework (Table 3). Therefore, stakeholders could explore possibilities to increase the network's density in order to help address the difficulties in the implementation of sustainable development policy in higher education.

High closeness centrality indicates a high level of stakeholder influence, especially if the density of the network in which the organisations operate is low (Rowley, 1997). Only the policy framework for England and Northern Ireland mentions stakeholders with high centrality (i.e. higher education institutions and the funding body; Table 4). For institutionalisation, in higher education institutions, it is crucial that high closeness centrality organisations are pursuing sustainable development. However, if high closeness centrality organisations (e.g. funding bodies in England

and Northern Ireland) were to be removed, then their influential activity would also be removed. Issues related to high closeness centrality and high levels of influence by certain stakeholders could be solved by increasing the network's density (Shani et al., 2008). Although the higher density of the network and increased stakeholder participation can improve the democratic process, it has downsides especially due to being time-consuming (Kenis and Schneider, 1991; Tinker and Tzoulas, 2015). Therefore, it is desirable to increase stakeholder participation through the network's density.

Further research is needed on the quality and processes of stakeholder participation and the implications for organisational change in the context of sustainable development implementation in higher education. Additional research on the practical implications and perception of roles and influence of specific stakeholders within higher education sustainable development networks is needed. Also, empirical research would be useful to gain further insights in terms of the stakeholders' role and influences within the network.

5.2. Governance at network level

Stakeholder participation is a complex and non-linear process (Galuppo et al., 2014; Butler et al., 2017). Collaborative work involving different stakeholders (Figs. 1–3 and Table 2a) requires governance arrangements (Galuppo et al., 2014; Randles and Laasch, 2016; Butler et al., 2017). Governance can support evaluation and feedback that help aligning efforts within and between organisations (Bouwen and Taillieu, 2004). Governance is necessary to ensure conflict resolution, collective action and resource allocation (Provan and Kenis, 2008). Collaboration without clear governance (Figs. 1–3) may have a negative effect on the integration of sustainable development in higher education. Centralised governance at network level may not be appropriate due to inevitable hierarchy and control (Kenis and Provan., 2006). On the other hand, shared governance requires consent on interdependence and on power-sharing (Bouwen and Taillieu, 2004). Organised networks in policy formulation and implementation that rely on horizontal co-ordination rather than hierarchical control have increased (Kenis and Schneider, 1991).

The number of organisations included in a network and the network's density could help determine its governance form (Provan and Kenis, 2008). Network densities are low in England, Northern Ireland and Wales and high in Scotland's policy framework (Table 3). Shared governance is the most appropriate form when the density of the network is high (Provan and Kenis, 2008). Therefore, it is unlikely that the most appropriate governance form to support the formulation and implementation of sustainable development policy frameworks in higher education in England and Wales would be shared governance according to the information suggested in the policy frameworks. On the contrary, Scotland could use shared governance. However, to predict the effectiveness of network governance forms for each country, an empirical evaluation of density, stakeholder number, goal consensus and the need for network level competencies (Provan and Kenis, 2008) would need to be undertaken. Also, further research is needed on the role of governance at network level for sustainable development in higher education in order to understand how networks' governance happens in practice.

5.3. Financial model at network level

Stakeholder participation for systemic change (e.g. change within the higher education sector) requires long-term processes, platforms and structures (Galuppo et al., 2014; Butler et al., 2017). The policy frameworks suggest some funding interactions but there is no clear pattern of funding flows (Figs. 1–3). Funding interactions occur between two stakeholders rather than systematically across the network according to the policy frameworks (Figs. 1–3). Monetary incentives may be effective in mainstreaming some behaviours and practices over others (Randles and Laasch, 2016). However, in the context of sustainable development monetary incentives could trivialise and commercialise ethical, political and social-environmental considerations. Therefore, the lack of a financial model could be an important barrier in the processes of institutionalisation.

Fundamental change of financial systems at global level is required for sustainable development (Biermann et al., 2012). Innovative financial models could be developed to mobilise financial resources towards the implementation of sustainable development (Müller, 2008). In addition, sustainable development could be fully integrated into national policy and environmental and social goals could be mainstreamed (Biermann et al., 2012). In higher education, institutional support is required in order to formulate and implement sustainable development policy frameworks. This support is not clear from the information in the policy frameworks (Figs. 1–3). Therefore, stakeholders in the national network could include financial commitments and these could feature in the policy frameworks at national level.

The findings of this paper are particularly useful to national policymakers with an interest in embedding sustainable development into the higher education system at large. Firstly, this research has identified gaps in the international, national and institutional level stakeholder networks that may prevent the deep institutionalisation of sustainable development in higher education. Secondly, the paper is useful to those working on the ground because it provides an overview of the issues at national level for a better understating of the stakeholder context in which they operate. Thirdly, insights regarding institutionalisation of sustainable development in higher education organisations might be useful to understand why international policy developed by UNESCO is difficult to implement.

The paper provides evidence that could help develop sustainable development national networks for the UK, other countries and at global level. In addition, the evidence presented in this paper could help to develop policy frameworks at international, national and institutional level for higher education institutions and other organisations in the higher education sector. For instance, policy networks could be developed using information related to finances, governance, stakeholders, density and centrality presented in this paper.

6. Conclusion and recommendations

The aim of this paper was to develop new insights into organisational change processes in universities relating to sustainable development. The key new insight is that the existing networks identified in the policy frameworks may not support the effective integration of sustainable development in higher education. First, the low-density of the national networks indicates that stakeholders do not have sufficient interactions for the effective integration of sustainable development. Second, the policy frameworks lack a clear governance vocabulary, which indicates that the activity at network level may not be sufficiently co-ordinated. Third, the lack of explicit funding flows between organisations indicates that there is no clarity in terms of the financial model at network level. Improvements in planned organisational change towards sustainable development in higher education could occur by increasing network density; establishing shared governance; and developing clear financial models ensuring overall policy review

and update.

Future steps can include interviews with policymakers engaged in the development of the policy frameworks to ascertain their views in terms of the findings of this study. Interviews with policymakers could help address some of the limitations of this study, as the omissions in the policy frameworks could be discussed. Other potential next steps could include studying actual stakeholder interactions' perceptions by key informants in each of the stakeholder institutions included in the policy framework. Actual interactions or perceived interactions versus interactions included in the policy frameworks could therefore be investigated. A study of this sort would help determine the mechanisms of policy implementation, as well as areas of activity and communication that could be addressed for better policy implementation.

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