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A Conceptual Framework for Developing the Cost of capital of Stakeholders: Case study of Sustainable Hockerton Ltd.

Abstract:

While many papers discuss stakeholder involvement instead of shareholder focused business, there remains no practical tool/concept to bring the triple bottom line of people, profits and planets (Elkington, 1994) together. In this paper, we introduce a framework for calculating the Cost of Capital for stakeholders (CoSC) of a firm. This framework can be of use to many types of businesses and territorial organisations, including community businesses. We thus introduce a means by which shared values can be measured through a practical approach. This concept is illustrated by using a case study of Sustainable Hockerton Ltd. (SHOCK), a small community organization in Nottinghamshire, U.K.

Key words: Stakeholder, CSR**,** Triple bottom line, cost of capital, sustainability, case study, community energy, social enterprise

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Abbreviations:

CSR-corporate social responsibility

DECC-Department of Energy and Climate Change, UK

EU-European Union

NASA-National Aeronautical Space Agency, U.S.A

SHOCK-Sustainable Hockerton Ltd.

WACC-Weighted Average Cost of Capital

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Introduction

Judging by the Financial Crisis of 2009 and recent environmental disasters (such as BP oil spill), business is often viewed as a myopic actor driven by self-seeking interest of maximisation of financial performance and paying scant heed to its impact on the ecosystem. The capitalist system appears to be in crisis these days (Porter and Kramer, 2011). It has been, subsequently, suggested that business can gain competitive advantage and usher in social change by working collectively with other agents and basing its decisions on shared values (Kramer and Pfitzer, 2016). These shared values should reflect the interests of its triple bottom line stakeholders i.e. society, environment and economic interest (De Silva and Pownall, 2014; Redclift, 2005; Hart and Milstein, 2003; Elkington, 1994) for continued sustainable development. The focus, currently, is not whether this is important but how firms can achieve this (Glavas and Mish, 2015); few indicators or measures have been developed to bring the three stakeholders together and compare results in a meaningful way. Even as organisations have become instrumental and measure driven (Gao and Bansal, 2013), there is a paucity of literature on how to construct holistic/integrative tools/measures for triple bottom line businesses. Many firms, such as Nike, publish sustainability reports (Nike, 2016) but these have limited clarity of linkage and integration with financial statements and business performance as there is no single measure cited to combine the financial and sustainability information. Though mainstream finance teaching and research in business schools is technical and focuses on owners' financial investment (Lakshmi 2013, 2016) i.e. the economic pillar, those techniques fall short of incorporating the other two pillars within their scope. In terms of shared values or stakeholders, all three pillars are equally important. It is thus evident that there is a gap –while there is clear agreement that sustainable development is dependent on the triple bottom line, there is need for the development of practical tools (Jenkins, 2006) in the area of business practice to enable the measurement of the effectiveness of combining triple bottom line or "planet, people and profit" (Elkington, 1994). These tools should be simple and should allow comparisons in order to make them usable.

We attempt to bridge this gap by introducing a conceptual framework for measuring the cost of stakeholders' capital (CoSC). The (Weighted Average) Cost of Capital (Reilly and Wecker, 1973),

commonly known as WACC, is an important concept in finance but is confined to measuring the interests of only different categories of financial investors. It provides a measure of how much the business spends servicing its financial investors and subsequently becomes the hurdle rate against which all potential projects are screened. If they earn less than the cost of capital, they are considered unviable. The WACC, thus, has an important impact on the value of the firm-currently the value is biased because the WACC only takes into account the financial stakeholders' interests. In concordance with the triple bottom line argument, the CoSC is developed using the three pillars: financial investors, the environment and the community (i.e. the society) as the primary stakeholders as an extension of the cost of capital concept. In addition, we illustrate this concept by using a case study of Sustainable Hockerton Ltd. (SHOCK), a small community organisation in Nottinghamshire, U.K. Our main aim in presenting this case study is to show how it incorporates the three pillars in its business model. We discuss how CoSC can be estimated and applied to value the business. This idea is expanded upon in the paper and may be generalised across all types of business enterprises.

We do not claim in this paper that this is the correct figure or the prescribed figure for CoSC for all such communities. Indeed, the cost of capital valuation methodology remains an academic debate in the finance area based on different theories. Our aim is to develop a framework for how and why the cost of capital concept can be extended to the financial toolkit in various organisations to include the environment and community. During the discussion, we will also refer to the concept of Corporate Social Responsibility (CSR)[1] insofar it informs our debate related to shared value and the concept of stakeholder orientation.

We start by reviewing the literature for Stakeholder theory. Next we proceed to discuss briefly the case study of Sustainable Hockerton Ltd. We then develop our model and its drivers following which we present our findings. Finally, we discuss and provide a summary.

[1] The concept of CSR is interpreted widely, as Moon (2014) notes the definition and use is open to a myriad of organisations and firm types.

Literature on Stakeholder Theory

As suggested before capitalist system is generally seen to be in crisis and business is considered a major contributor to the social, environmental, and economic problems in the world. The solution, Porter and Kramer (2011) suggest, might lie in the principle of shared value by creating economic and social value at the same time. Freeman (2010) in this direction propose the idea of 'Stakeholder capitalism'. Freeman et al (2011) also state that stakeholder theory (discussed in following sections) better equips managers to articulate and foster the shared purpose of their firm. Friedman (1962), on the other hand, had famously and quite controversially remarked that the social responsibility of the business is to increase profits. In fact, it is still believed to be the wide prevailing shareholder approach and sustainability is seen as an oxymoron (Moon, 2014). Nevertheless, academics and practitioners, alike, are calling for more humane, ethical and a transparent way of doing business (Stiglitz, 2010; Porter and Kramer, 2011; Greenwood and Freeman, 2011). In this regard, the 'stakeholder' approach, in line with CSR standpoint, indicates that organisations are not only accountable to its shareholders but to other different stakeholders as well (Freeman, 1984).

However, it is generally known that most organisations have been ignoring their contribution to the community (external stakeholders) at large, while over emphasizing their self-preservation (agency). Moreover, little attention has been paid to the environment. Having mastered their operations, these businesses have created their own 'separate kingdoms' within a society (Van Marrewijk, 2003). On the contrary, in reality, the business should form an important triangular relationship with the State and the Civil society and its natural environment. Each plays a specific function within a society and common values and norms of these three players play a major role in shaping society (Van Marrewijk, 2003). There are some businesses which demonstrate this. However, later, in the case study of Sustainable Hockerton, we will note some of the features discussed in terms of the state, civil society and its interaction with the business and its environment.

This importance of stakeholders and their interests leads us to the discussion of one of the influential management theories that has gained significance in recent times-the stakeholder theory (Freeman, 1984).

Stakeholder Theory

The Stakeholder theory while taking stock of the people or stakeholders who 'can affect or can be affected by the work of the organisation' states that organisations need to be cognizant of stakeholder interests for their long term effectiveness (Freeman 1984). This theory is based on traditional normative precepts (Kantianism, utilitarianism and justice ethics) and contemporary philosophies (feminist ethics and discourse ethics). In academic literature, three common uses of stakeholder theory have been discussed: descriptive, instrumental and normative (Donaldson and Preston, 1995). Descriptive theories describe and explain how in the context of CSR, managers think about their responsibilities, and balance the interests of different stakeholders; instrumental theories are used to depict the connections between CSR, stakeholder management and the achievement of traditional organisational objectives like growth and profitability; and the normative focuses on the context of CSR research while exploring the moral or philosophical guidelines underpinning CSR and stakeholder management in specific situations (Jamali and Freeman, 2015).

Contrary to what Donaldson and Preston (1995) state that stakeholder theory needs to distinguish among these three forms; Freeman (1994) considers the distinction that leaves business and ethics disconnected as artificial separation. Freeman (1999) claims that all three uses of stakeholder theory have elements of the others embedded within them and suggests to adopt a fourth approach to stakeholder theory combining descriptive, normative, and instrumental versions: the managerial approach (Donaldson and Preston, 1995; Freeman 2000; Jawahar and Mclaughlin, 2001). The managerial stakeholder theory enables the managers to make decisions that create more value for all the stakeholders affected by the decisions (Freeman, 2000).

Freeman et al (2004) state that shareholders are stakeholders and creating value for stakeholders creates value for shareholders. In addition, creating value for stakeholders is important at least from the standpoint of avoiding any deviation from government regulations. They also state that stakeholder theory can be many things but it is certainly not "everything non shareholder oriented." (Freeman et al, 2004)

As Freeman et al (2004, p. 364) state that:

"Dividing the world into "shareholder concerns" and "stakeholder concerns" is roughly the logical equivalent of contrasting "apples" with "fruit." Shareholders are stakeholders, and it does not get us anywhere to try to contrast the two, unless we have an ideological agenda that is served by doing so."

Shareholders are an important part of the business but the 'Separation thesis' negates the fact that managers need to develop and nurture relationships with other stakeholders also by building communities "where everyone strives to give their best to deliver the value the firm promises" which is the core of Stakeholder theory (Freeman et al, 2004).

In this regard as well, Argandoña (1998 in Freeman 2010) emphasise the notion of the common good as a way to think about the corporation and its obligations to stakeholders. Argandoña notes the weakness of existing "theoretical foundations" within stakeholder theory (1998: 1100) and the arbitrariness of any duties that emerge. He claims that the notion of the common good can provide the robustness required of any such candidate for undergirding stakeholder theory and that it can help to determine the various rights and duties of the stakeholders involved. In this regard, we may also propose the model for Stakeholder Management by Kakabadse et al (2005) as shown in Fig. 1 as hereunder:

----------Fig 1.here----------

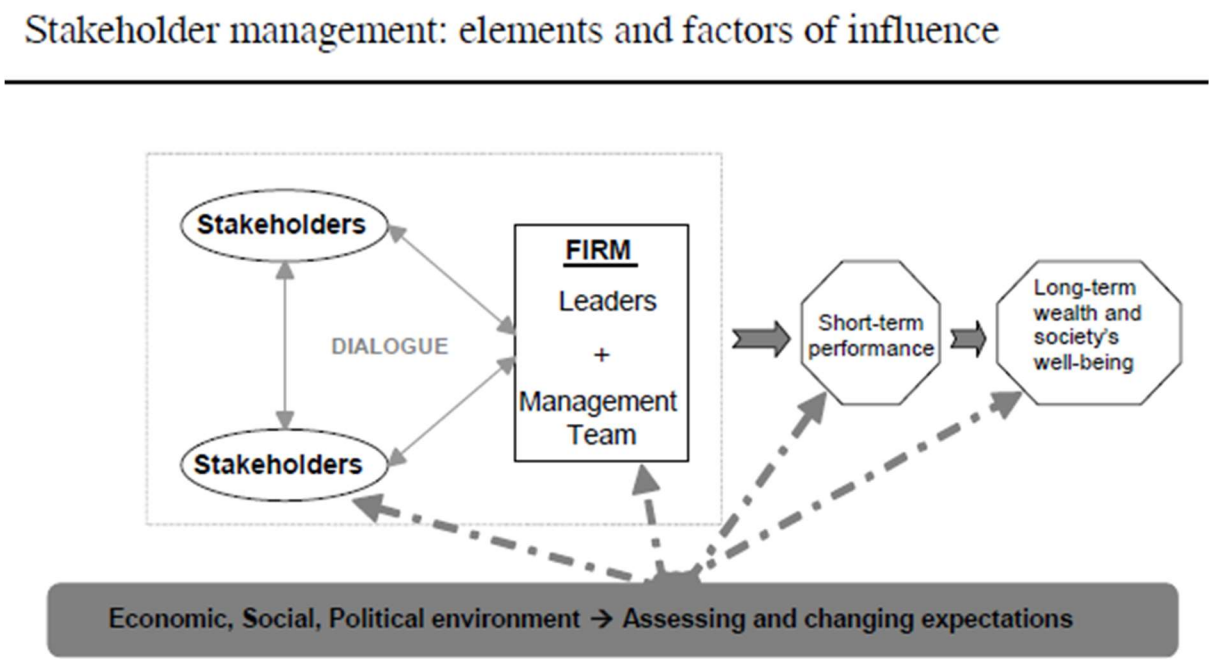

Figure 1: Stakeholder Management: elements and factors of Influence (Kakabadse et al. 2005)

The Kakabadse et al (2005) model emphasises the importance of the context, and that of Stakeholder Management, besides the organisation's short term financial objectives as well as long term societal goals.

This model conveys the importance of context to our understanding and practice of CSR which we discuss now insofar as it informs and links with the stakeholders' perspective. According to Kakabadse et al (2005, p. 295) the companies need to engage with different stakeholders in an open and constructive dialogue focusing not only on short term but long term goals benefiting the whole society including the organisation. These goals focus on the economic, social and political environment. As Kakabadse et al (2005, p. 295) state:

"The *environment also influences stakeholders and firms as it may change the members of society's expectations, values or priorities, which affect the dialogue and may change the parameters defining performance, wealth or society's well-being."*

In the same vein, El Ghoul et al (2011) state that enhancing CSR performance improves the firm's relationships with key stakeholders, leading to better financial performance including, lower cost of equity and the better financial performance results in improved CSR performance. They also argue that the stakeholder theory in terms of capital structure proposes another channel such as leverage through which social responsibility may affect financing decisions and thus the cost of equity. Furthermore, they contend that high CSR firms tend to have lower cost of equity capital whereas low CSR firms have a reduced investor base and higher perceived risk (El Ghoul et al, 2011). Deng et al (2013) also state that CSR activities have a positive effect on shareholder wealth because focusing on the interests of other stakeholders increases their willingness to support a firm's operation, which increases shareholder wealth and hence their interest. In addition as broader stakeholders in high CSR firms are in greater alignment, they are more likely to contribute to firms' long term profitability and efficiency.

On the contrary, El Ghoul et al (2011) state that although CSR investment in stakeholder engagement like employee relations, environmental policies, and product strategies contribute to low cost of equity; engagement in the areas of community relations, diversity, and human rights do not. They conclude however that CSR activities including environmental policies do contribute to society at large and they also benefit the firm by lowering their financing costs including cost of equity and enhance the value of the firm for shareholders.

However, while catering to the needs of the wider stakeholders and in the absence of any viable instrument for measuring the stakeholders' cost of capital, managers tend to aggrandise private benefits at the cost of shareholders (Jiao, 2010). This also begs the question whether managerial decisions on stakeholder welfare are made for shareholder value consideration or managers' personal interests like respect, honour, or job security (Jiao, 2010). In addition, Hillman and Keim (2001) state that managing stakeholder relationships entail much more than just their continued participation in the firm. Effective stakeholder management including that of community and the environment may consist of intangible, socially complex resources that enhance firms' ability to outperform competitors in terms of long-term value creation (Hillman and Keim, 2001). However, there are very little criteria that we have at present that can capture this in terms of financial equations or some similar measures. Barnett (2007) reviews the business case for stakeholder engagement in achieving CSR.

The preceding discussion underlines the need for better accounting practices that may capture the cost of capital in terms of its stakeholders as well since the present equations capture the tangible and measurable criteria associated with the financial tools. There is a need to take into account the community and the environment besides the investors. In addition, in line with what has been mentioned so far, Jones and Wicks (1999) argue for the case of stakeholder theory having both normative and instrumental justification. Besides, as they state, there are compelling reasons within stakeholder theory to value both normative and instrumental support *'because of both the Kantian idea of "ought" implies "can" and the idea that for stakeholders to receive benefits, managers have to act in such a way as to keep the firm a going concern'*(Freeman, 2010). Furthermore, Donaldson (1999 in Freeman 2010) argues that the linkages provided by Jones and Wicks to combine the normative and instrumental strands of theory are insufficiently strong and that researchers need to explore managerial statements to better connect normative commitments and instrumental outcomes; our research is an endeavor in that direction. We propose, while following the triple bottom line approach (Elkington, 1994), a new measure, termed the cost of stakeholders' capital (CoSC). We argue that the stakeholders of the firm viz. the investors, the community and the environment also should be compensated for the use of borrowed capital, be it financial, environmental or community volunteering. The firm should compare the return on all new projects (Internal rate of return) to the CoSC.

The Case study of Sustainable Hockerton Ltd. (SHOCK)[2]-A brief description

We review a small social enterprise in Nottinghamshire, United Kingdom, which is a community wind turbine project jointly owned by locals and promoted by locals. It started producing energy in 2010 using a Vespa29 turbine which the villagers had jointly purchased in 2009. The entire project was funded by local people or their close relatives. The application for a small 225kW wind turbine was submitted to the local authority on October 29th 2007, installation took place in Autumn 2009 and production started in 2010 (Sustainable Hockerton Ltd., 2016).

The discussion to begin this project started in July 2006 and was helped along with community meetings to elicit local opinion and guidance as to ways and means to make the village a zero

[2] The aim of this section is to illustrate how the project incorporated the three pillars within its remit.

carbon village. On a wider context, this village already had a group of dwellers who had founded the first earth sheltered community with zero carbon houses (Hockerton Housing Project, 2016). They had prior experience of having installed two turbines for their own needs. However, their settlement was initially not well integrated with the rest of the village. Nonetheless, their role in this project was crucial and also helped the village to become more cohesive.

This village of Hockerton is a small parish and nearly 50 people attended the meetings in total. The village itself is a typical commuter village and property prices are above the national average. A large number of houses are detached and the population comprises of a class which earn above the national wage rate. A village postal survey, conducted in February 2007, with a 25% completion rate indicated overwhelming support for the turbine-29 households were in favour of the project and four households were against. The aim was to make the village sustainable in terms of energy requirements, making it carbon neutral. As a starting step, it was felt that a community turbine would help offset the energy used by each household by selling the electricity produced to a green supplier which specialises in renewables. Since wind turbines fall under renewables, it was envisaged that an additional green payment Feed in tariff (FIT), in the form of certificate income would be received, in addition to normal price of electricity exported. An energy audit of household usage indicated the amount of energy needed to be produced to render the village zero carbon, thus indicating what kind of wind turbine to be purchased. The income generated would help investors offset their bills. Local people agreed on the name of Sustainable Hockerton Ltd. and the format of a cooperative organisation in the form of an Industrial and Provident Society. It was decided in the meetings that the return on invested capital would be within a range which offered a premium based on the current interest rates. All other profit would belong to the community or fresh environment projects. The estimated figure of energy produced and carbon emissions offset came from DTI wind speed data and technical knowledge of local engineers. Documents to form the company and financial guidance again were drafted with the help local professionals. The exact location too was identified with the help of local villagers, technical knowledge and the agreement of local landowners to rent the land for the life time of the project. A site which allowed the wind turbine to be at least 500 meters away from any property was chosen and the land was leased from a local farmer. The turbine went through a planning project application with the local council. Due care was taken to meet noise, wildlife, aviation and neighborly requirements. An initial decision to allow the wind turbine to be installed was given

but was appealed against by a resident from a neighbouring village. The appeal was won by SHOCK Ltd. when presented in the District Council and the case made on behalf of the village body (The Newark Advertiser, 2008). This was well before many other wind turbines were installed in the area and thus set a precedent for other village community wind turbine projects.

The income stream accrues from sales of electricity to the National Grid via Good Energy Ltd. and the Green FIT certificates held by SHOCK Ltd. The turbine has been successful in meeting its objectives of clean energy production and also has generated a variety of other projects: three more on solar energy generation and increasing the community spend in the village through projects such as community talks, funding social events which foster increasing participation and integration, installation of a library in an old disused phone box, giving cash subsidies to villagers who adopt green measures and installation of an electric vehicle charging meter. Every year, an allocation is made of a pot towards village sustainability.

The governance is done through a rotating board of directors who are in situ for three years and then must either resign or stand again for election. A transparent system of discussing issues openly is in place. The organisation is run as a small business by a full time member and files its accounts under the Financial Services Authority (Information collected from local villagers and Sustainable Hockerton Ltd., 2016).

In the next section we show how data from this company can be used to estimate the CoSC. The company has been used in this paper as it was set up using resources from the community, finance and the environment.

The Model

In our study we propose primary stakeholders are the environment, the financial investors and the social community in line with the triple bottom line approach. Our reasons why environment has such a high priority is based on the case study described above, academic literature and wider policy reports. As stated by Porter and Kramer (2011), the health of the company is closely associated within the communities in which they operate. They further state that the community is essential for the business for not only creating demand for its products but also for providing critical public assets and a supportive environment. Hart and Milstein (2003) further stress that for directly addressing the sustainability challenge, companies are striving to solve social and

environmental problems through the internal development of new capabilities instead of just trying to decrease the negative impacts of their operations. In this respect, the search for clean technologies, leading to sustainable competencies, is key to a business's development and success in future markets.

Our case study falls quite obviously in this remit; we now proceed to present the theoretical and policy literature for renewables and the usage of community groups in this regard.
Energy has become one of the most pressing issues of our time. Various global agencies have agreed that the threat from climate change is real. The NASA (2016) website states that carbon dioxide levels are the highest in the air since 650,000 years. The global temperature is up 1.4 degrees Fahrenheit since 1880 and the ice cap is rapidly melting. Nine of the ten warmest years have occurred since 2000.

The European Commission put legislative measures behind the imperative to act for change. European Commission (2016) outlines the Europe 2020 Strategy for growth: five headline targets that set out where the EU should be in 2020 in order that this growth is not only inclusive and smart but also sustainable. One of these headline targets relates to climate and energy. Member States have committed themselves to achieving the 20% energy efficiency target by 2020 by reducing greenhouse gas emissions by 20% and increasing the share of renewables in the European Union's (EU) energy mix to 20%. Recent advances in sovereign agreements on climate change treaty and actions therein have been agreed in the Paris accord.

The UK Government, too has been proactive in tackling climate change and has been launching schemes on various fronts to take this action through the Department of Energy and Climate change (DECC). There has been an active political drive to meet the energy problem. The National Renewable Energy Action Plan (2009, p.5) proposed that 2% of all supply should come from small scale sources. One of the key recommendations has been the Government policy in the UK has been to make all new homes from 2016 to be carbon neutral (Sustainable Hockerton Ltd., 2016).

"The policy, as set out today, requires all new homes from 2016 to mitigate, through various measures, all the carbon emissions produced on-site as a result of the regulated energy use. This includes energy used to provide space heating and cooling, hot water and fixed lighting, as

outlined in Part L1A of the Building Regulations. Emissions resulting from cooking and 'plug-in' appliances such as computers and televisions are not being addressed as part of this policy.

This policy is well aligned with European Policy, specifically the Energy Performance of Buildings Directive (recast) which requires all new buildings to be nearly Zero Energy Buildings from 2020 (nZEB), as described in Article 2 of the EPBD." (Zero Carbon Hub, 2016)

The encouragement of moving from fossil fuels to renewables has been supported by financial incentives such as grants and feed in tariff policy which rewards producers of renewable sources of energy. The use of on shore wind turbines has been part of this and has been increasing (DECC, 2016). In January 2012, The Coalition for Energy Savings (2016), an EU initiative, was formed bringing together ethical and community friendly banks, environmental NGOS and Communities and Climate Change Action Alliance and Community Energy Practitioner Forum. These have worked with the DECC influencing the social agenda for Renewables thus leading to the increase in renewables such as wind turbines (off shore and on shore, solar power, biomass etc. (DECC Renewables Energy Trends; 2016, chart 6.3). DECC Renewables Energy Trends, 2016, Table 6.1, p. 47 shows that there has been a 30% increase in electricity generation from on shore wind turbines from 2013-2015. In terms of installed capacity during the same period, there has been a 6.2% change. The UK ranked 8th in terms of total installed wind capacity in 2013 (Fast, 2013). Wind energy remains a contentious form of sustainable energy; when there is no wind, recourse has to be made to the grid which may rely on nuclear and other forms of energy. Nonetheless, it is regarded as an important source in the mix of energy production sources.

Community energy groups have been increasing rapidly, providing 4MW in 2003 to 60MW in 2013. This fourteen fold increase is mainly from wind projects which form 80% of the share (Harnmeijer et al, 2013, p.3). As some forms of renewable energy (such as solar and wind) can't be easily stored, the drive to increase its adoption is dependent on both hard and soft (social) factors (Strachan et al, 2015).The former are technical factors but the latter relate to the economic geography, local actors and their mix (Boyd and Paveglio, 2015). De Silva and Pownall (2014) find, for example, that whilst income is not the driving force in the preference for adoption of green measures, education and gender are. College educated women are the most willing group to accept measures to "go green".

Strachan et al (2015) (Fig 1, p. 4) note that the level of acceptance and production are related to the type of business organisation in this sector. They outline various forms of businesses which are in the renewables production sector. These range from micro community projects to multinational commercial firms as players in the industry.

One of the interesting areas is the increasing social acceptance and the bridging of the 'social gap' between public demand for green energy and the permission given for renewables. It is noteworthy however, that the role of community engagement in renewables remains weakly developed. Although, the UK has seen a growth of community renewable projects but there is still a persistence towards large centralized corporate projects (Strachan et al 2015). Rennie and Billing (2015) discuss the social acceptance of renewable energy in the Highlands and Fast (2013) reviews the literature in this area. The largest share of social acceptance studies has been on wind energy generating 79 out of 121 journal articles. Social acceptance studies on UK have led with 41% of the total of global studies. The DECC (2011, para 3.5) state that projects are more likely to succeed if they have the broad support afforded by local communities. Lakshmi et al (2015) discuss how the interactions between community members can create territorial capital. In the case of Hockerton, we note many features identified: there was already a precedent in values given to the environment in the form of Hockerton Housing Project. Secondly, the social mix of the village emanates from an educated class profile comprising of lawyers, university professionals, managers, artists and doctors. Thirdly, the long preparation time taken from 2006-2009 was not just about investigating hard factors for success; it was also a democratic process bringing people on board. During the course of the meetings, all dissent was aired and opportunities were given for people to participate with equal voice.

In the next sub section, the drivers in the model are discussed.

Drivers

The cost of capital concept is used traditionally in corporate finance to measure the return to the investors of finance for the use of their capital. The argument is that investors (shareholders and lenders) need a return for the capital they have invested, to compensate them for the opportunity cost of using their funds in some other scheme. It is hence a return for the use of their funds. The cost of capital is then used as the hurdle rate which every new project is expected to earn at least, to be considered feasible. Since the firm is considered to be a bundle of projects, the value of the

firm at a point in time is the total value of all projects or total cash flows from all projects across time discounted by the cost of capital. Thus the cost of capital is considered to be a key concept in finance and financial management. Reilly and Wecker (1973) present a succinct account of the concept; recently Pratt and Grabowski (2008) discuss more detailed approaches.

As Porter and Kramer (2011) had stated that the business is viewed as a major cause of social, environmental, and economic problems in the world; they are seen to be prospering at the expense of society at large. Hence, there is a dire need of leadership for bringing business and society back together. The solution, they suggest, might lie in the principle of shared value by creating economic and social value at the same time. This can be done by addressing society's needs and challenges, thus connecting company success with social progress (Porter and Kramer, 2011). In this regard, we propose, following the triple bottom line approach (Elkington, 1997) a new measure, termed the CoSC. We argue that the stakeholders of the firm viz. the investors, the community and the environment also should be compensated for the use of borrowed capital, be it financial, environmental or community volunteering. The firm should compare the return on all new projects (Internal rate of return) to the CoSC. As Redclift (2005) states the new sustainability is no longer primarily a question of maintaining, and enhancing, existing environmental resources; it is about engineering new ones. In addition, as Hart and Milstein (2003, p.60) mention:

"The problems of material consumption, waste, and pollution associated with industrialization present an opportunity for firms to lower cost and risk through the development of skills and capabilities in pollution prevention and eco-efficiency. Extensive empirical work has also now made it evident that, with the appropriate set of skills and capabilities (e.g., employee involvement, continuous improvement), firms pursuing pollution prevention and waste-reduction strategies actually do reduce cost and increase profits."

The weighted average cost of capital (if tax is not an issue) is calculated through the following equation:

$$\frac{D}{D+E}i + \frac{E}{D+E}d \qquad (1)$$

Where D: debt investment, E: equity, i=interest rate, d=dividend rate

If there are three stakeholders, the cost of stakeholders' capital (CoSC) per annum becomes:

$$\frac{W}{W+F+S}e + \frac{F}{W+F+S}k + \frac{S}{W+F+S}c \qquad (2)$$

Where W=Environment capital i.e. Monetary value of investment by environment

F=Financial capital invested

S= Community/Social Capital i.e. Monetary value of volunteers invested

e =Percent Return on environment per annum

k=Percent Return on financial capital per annum

c=Percent Return on society per annum

Note that Percent (.) is calculated as monetary values of environmental return, financial return and societal return on capital of these components.

Measurement of F and k

These are the most straightforward of all. SHOCK invited capital from local villagers in the form of members' holdings worth £500 each. In total £235,250 was raised for the purchase and installation of the wind turbine. The village decided that the range of financial return should vary between 5% and 8%. This was done with the consensus of the group after one of the residents recommended the rate based on the Bank of England rate. Thus F is £235,250 and k is computed from the figures in monthly and annual accounts of the company made every financial year to investors (there are only one category of investors).

Measurement of e and W.

The figure for W denotes the environmental capital cost of the project and is not easily available. It refers to the monetary value of environmental resources taken to construct, commission and decommission the wind turbine. The figure for e refers to the imputed returns for the environment's role as a reward in exchange for the environmental capital. In other words, by borrowing the capital

from the environment, economic rent accrues toward its use. This may be proxied in many forms but is essentially the opportunity cost. We use the figures collected by SHOCK in relation to carbon emissions[3] saved in tonnes per month. These are converted by a greenhouse gasses conversion factor (GHGs) which is set by DECC which measures the value of renewables in the set of energy sources. The conversion factor is time varying depending upon the DECC's policy. We next multiply this by a monetary value of carbon announced each year by the Secretary of State for Climate change (European Union, 2015). This has typically varied between £5.611 (2016) and 4.27 (2014). This allows us to calculate the monetary value of carbon emissions saved for the time in operation. If we trend this for the remaining life of the project, for say 15 years, we can obtain the estimated monetary value of returns in the form of savings in carbon emissions. Totalling these will allow us to calculate the cumulative monetary returns.

To obtain a value for W, we look towards the scientific literature for help. A technical estimate for the efficiency of use of energy is EROI i.e. the ratio of energy delivered to energy cost. Kubisewki et al (2012) calculate the EROI for many wind turbines. They estimate this to be in the range of 19.8 - 25.2 in their studies. This translates to stating that wind turbines on average, generate between 19.8 to 25.2 times the energy they take to be manufactured and commissioned. If we take the EROI figure (say 19.8) to be correct and we use our estimated cumulative monetary value of carbon emissions saved, we can work out the figure for W i.e. environment cost. Using annual figures for monetary value of carbon emissions saved and dividing by W allows us to estimate the various annual values for e.

Measurement of S and c

We need to estimate the community capital, S which is the imputed capital invested by members of the community. It encompasses all the monetary value of meetings during 2006-2009, the survey taken, the appeal by the Parish and the legal, technical and consensual framework adopted by the community and its various actors. To do this we, note that ten meetings took place during this period of approximately 2 hours duration each and on average 20 villagers attended these. In addition, we can estimate the man-hours invested in the various other activities. The total man-

[3] A second order effect might be the tons of Sulphur oxides (SOx), Nitrogen Oxides (NOx) and particulate matter emitted by fossil-based alternatives to generate the same energy, and by the water footprint of fossil-based energy systems this turbine seeks to replace.

hours can be estimated by converting to a monetary value by multiplying with the UK median wage rate[4]. This approach was followed by looking at volunteering websites (Haldane, 2014; Volunteer Centre, Bath and North East Somerset, 2016). The choice according to one of the websites was to use the UK average wage rate. However, given the socio economic demographic parameters of the residents, the median wage was used (Trading Economics, 2016). The monetary value for community return was obtained from the figures for village sustainability pot allocated each year in the accounts. Dividing these figures by *S*, allows us to estimate annual levels for *c*.

Findings and empirical results

There are two main sources of total income stream (TI): Feed In Tariff certificates income (FIT) and electricity sales income (TE).

----------Table 1 here----------

Table 1. Correlation amongst sources of Income and Profit				
	TE	FIT	TI	Profit
TE	1			
FIT	0.0070	1		
TI	0.1663	**0.9091**	1	
Profit	0.1280	**0.7963**	**0.8421**	1

As can be seen from Table 1 above, the largest driver of income and profit is the income from certificates (FIT). This explains 91% of the income and almost 80% of the profit. As expected, Profit and Income have a close relationship of above 84%, suggesting that annual expenses are relatively constant.

When the monthly returns of total income (percent change in monthly total income) is calculated it is also positively correlated (0.34) to monthly returns of FIT certificate income (Table 2). Thus

[4] This is a first order approximation as fractional employment or retirees are all are being classified under one category. This also ignores the full time paid employee hours which we treat as an expense. We don't count directors time which is voluntarily driven. We are grateful to the referee for this comment.

certificate income has a very large bearing on the ability of the firm to earn. Correlations amongst other variables are small or negligible as expected.

----------Table 2 here----------

Table 2. Correlations of the monthly returns(Mret)				
	Mret_TE	Mret_FIT	Mret_TI	Mret_Profit
Mret_TE	1			
Mret_FIT	-0.1845	1		
Mret_TI	-0.0183	**0.3418**	1	
Mret_Profit	-0.0491	-0.0685	-0.0310	1

The distributions of returns on certificates are the most volatile and thus make profits also volatile. The returns vary due to changes in the performance of the turbine output due to seasons and breakdowns[5].

The least volatile are the electricity sales. Across time, this volatility has been high in October, August 2014 and biggest decline is for November 2015 (not shown here). The highest return for certificates was February 2013. The reasons for these are related to the performance of the wind turbine which tripped intermittently during that time. The variables also follow a non-normal distribution because skewness is not close to zero and kurtosis is much higher than 3.

----------Table 3 here----------

Table 3. Descriptive Statistics of annual returns and Parkinson risk (1980)								
	Returns				Risk			
	TE	FIT	TI	Profit	TE	FIT	TI	Profit
Mean	-0.2170	-48.99	-3.10	4.83	10.29	15.78	15.96	15.44
Std. Dev.	0.2022	35.70	1.02	18.08	2.04	0.8898	0.9227	0.5057
Skewness	0.1667	-0.9201	0.4172	-0.1384	1.07	0.8739	0.8885	-1.13
Kurtosis	1.89	2.16	1.95	2.79	3.38	2.96	3.07	2.95

On the other hand, annual returns and risk follow a close to normal distribution as indicated by the skewness and kurtosis values (Table 3). Risk of return i.e. the standard deviation of returns is high

[5] This makes the case for hybrid system stronger.

for total income and certificates income. The mean too, is the highest for these variables. The annual returns and risk figures indicate a normal distribution. The risk parameter used for the distribution of returns is based on Parkinson range risk estimator (1980) which is a robust non parametric estimator. The standard deviations of this Parkinson (1980) estimator show the dispersion of their risk estimates. The formula is Risk=(1/(4*log2))*(log(H)-log(L))^2

where H and L are the highest and lowest values in the year, respectively.

Our annual CoSC estimations for all the stakeholders and the individual stakeholders are shown in Table 4. below:

----------Table 4 here----------

Table 4. Estimates for CoSC and its Constituents

Years	*e*	*k*	c	CoSC
2010	117.00%	5.00%	1.09%	9.55%
2011	160.00%	5.50%	5.30%	11.79%
2012	127.00%	5.80%	20.10%	10.76%
2013	118.00%	6.20%	21.44%	10.78%
2014	102.00%	6.60%	95.38%	10.65%
2015	134.00%	7.30%	25.78%	12.49%

We can see that the CoSC is almost double the cost of capital for financial investors. The community rate also increased. However the capital base for these two (community and environment) are not particularly high. The capital of the community, *S*, is £10,000; the capital of the environment, *W*, is £ 476.56. The return *e* is high because of the EROI. The community returns, *c*, varies because of the varying size of the village sustainability allocation each year. CoSC is a relatively flat figure across the five years. There is a lot of volatility around the environmental return 'e' and the community return 'c'.

The risk return tradeoff posits that return is the economic rent for the risk taken, in financial theory in the long run. The relationship between CoSC and Risk shows this expected sign i.e. a positive relationship in Figure 2 below but after 2012. It should be noted that the graph can't be used to support or refute the theory because of too few observations. Nevertheless, it becomes an interesting starting point to explore further in future research.

----------Fig 2. Here----------

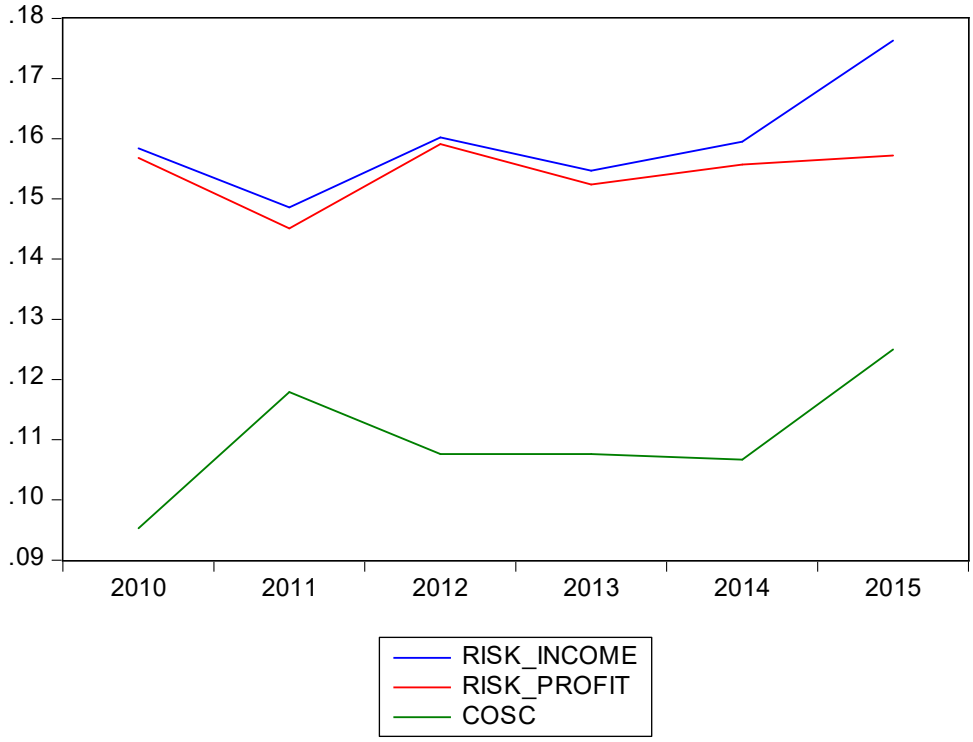

Fig 2. Relationship between CoSC and Risk.

Our estimates of CoSC may be compared to those found in other studies. It is important to note that we are computing the CoSC for all three stakeholders while the other studies compute the WACC only for financial investors.

The WACC shown by DECC (Frontier Economics, 2013, pg. 8) is 9.6% in UK as financing costs are high, although UK has high support compared to many other countries. Frontier Economics who conducted the study compared the level and nature of support for wind generation schemes in 26 countries. They find that support for wind farm is in the top half of the 26 surveyed countries. Another recent report by Windpower monthly (2015) notes that the WACC which is used for state-funded projects draw funding directly from governments and is termed the test discount rate. Values of WACC tend to vary between 4.7% and 7.5%, but the DECC generally uses a 10% test discount rate. The International Energy Agency uses an 8% test discount rate. The WACC in the

US in 2009 and 2010 for wind was between 5.5% and 12.6%, as the US is a low cost borrowing environment (Renewables International, 2014). In 2014, the weighted average cost of capital for wind energy projects in Europe were between 3.5% and 12%, depending on the country (Sun and Wind Trade reports, 2016)

Our figures are thus in line with other figures, but also reward the environment and the community as well for their involvement.

Discussion, summary and contribution

Not denying the utility of instrumental logic for sustainable organisational growth, the research informs that some companies do subscribe primarily to an integrative logic (Gao and Bansal, 2013). This integrative logic relates to a sustainability approach that balances the contradictions among the financial, social and environmental dimensions of business and looks for solutions for the interrelated systems. Academic research also supports that a business can develop strong stakeholder relationships through its commitment to social and environmental responsibility thus leading to vital intangible resources and capabilities for the business (Gao and Bansal, 2013). The social and environmental investments may also entail efficiencies and innovation in business operations as well, i.e. internalise the externalities. Nevertheless, the widely acknowledged interdependence among the three pillars of sustainable development has been largely ignored within organisational theory (Gao and Bansal, 2013) although businesses, lenders and regulatory authorities estimate the environmental, financial and community impact when commencing a new project. There is increasing recognition of maintaining the interests of the natural and social eco-system, not just those of the shareholders. Business schools have not yet developed an integrated concept of how shared values can be calculated and measured. Consequently, while there is talk of the need to discuss climate change and its impact or the business impact on society and employment, there has been no practical measure to do so. No organisation, large or small, irrespective of its owner characteristics, can remain immune from the need to incorporate financial discipline along with societal and environmental discipline in the long run. While case studies have been presented which discuss impact, it is always contextual and in units which cannot be deemed comparable across times or organisations.

In this paper, we computed the CoSC, cost of capital for stakeholders using an illustrative example from a community wind turbine project. We illustrate the concepts using a real life case study. In doing so we make three contributions: Firstly, most papers concentrate on measurement for companies, but fail to capture the impact of returns to stakeholders for smaller businesses or businesses with multiple objectives. For businesses which have social objectives or "more than profit" objectives, share prices and profits are not enough. There is thus a gap in terms of financial measures to judge performance. We develop here a tool which can be of use to many types of businesses and territorial organisations, including community businesses and those which are in all sectors. Secondly, Lakshmi (2016) points out that most finance research should make link between finance and ethics or contextual knowledge to keep the subject current. While many papers discuss the normative role of stakeholder involvement, there remains a separatist divide between the normative and the instrumentalists. We seek to break down those barriers. Thirdly, most papers ignore the role of environment as a stakeholder. In this paper, we conceptualise the capital lent by environment and attempt to measure it using a novel approach.

Our aim is to add to the financial toolkit which incorporates a triple bottom line, particularly in business pedagogy. Our aim is not to prescribe these figures but to suggest that the widening of this toolkit is possible. In different industries, there may be many methodologies to compute the CoSC. Our aim is to demonstrate that this computation is possible.

Indeed there are limitations in our work, which we must discuss. Firstly, we have used simplified figures such as an estimate of the life for our project. In reality, the wind turbine is second hand and may need to be replaced before then. Our projections are based on average trend for the five years, the turbine has been in operation. Wind speed can be notoriously difficult to estimate year on year, these might change. The calculation of the community capital is difficult to calculate precisely as it is based on a median per hourly wage. Secondly, we use a method of calculation for estimation of environment capital and community capital; there may be many other ways to impute the estimated values. Lastly, our model may misspecify the drivers. For example, one may argue that the return to the environment must include the hospital visits saved due to living in a cleaner environment. This would underestimate the returns figure used. Similar biases could enter other drivers also. The case study in question has been in existence for five years but has already

diversified into other income streams. This has had an impact on the village community allocation i.e. the main driver for *c*.

Notwithstanding, these limitations, we feel we have introduced the *principles* on which stakeholders' WACC is based. In terms of pedagogy, no such example has been used previously (Lakshmi, 2015). Thus we lay the foundation for other such tools to be developed. For example, if the WACC needs to be calculated for an employee owned company, one could simply replace the notion of community capital with employee capital. Also, this work could be extended to territorial organisations and landscapes. How do we value cities such as smart cities which are environmentally friendlier than others? Previous research suggests that people pay a premium to live in those places. The risk return framework (fig 2) suggests that stakeholders' WACC could be related to this premium.

Finally, we wish to end on a policy issue. Our paper is not about renewable energy or wind energy, but about the role that clean environment plays in the business ecosystem. The suggestion is that environment should be counted in the cost of projects and returns. Organisations such as councils and public sector housing as well as private housing do calculate the return from using green measures but this is voluntary. Using the total WACC as we have done may convince users that this is a feasible option for all. If sustainability is the agenda, surely the notion of financial investors' returns should be dropped in favour of returns for all? If there is any opposition to this as it may sound expensive, it may be pointed out that cheap capital in the present equates to expensive capital in the future. Someone (perhaps future generations) would have to pay a price for the alternative. Our paper thus ends on a note of inter-generational equity and cooperation for all i.e. shared values.

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