



How do developing country constraints affect renewable energy entrepreneurs?



Cle-Anne Gabriel^{a,*}, Jodyanne Kirkwood^a, Sara Walton^a, Elizabeth L Rose^{b,c}

^a Otago Business School, University of Otago, New Zealand

^b Aalto University School of Business, Aalto University, Finland

^c Indian Institute of Management Udaipur, India

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ABSTRACT

Renewable energy entrepreneurs in developing countries are selling and facilitating the uptake of a new technology and new ideas in an already difficult environment. We explore entrepreneurs' perceptions of the constraints they face while operating their businesses. We used two stages of analysis – primary data from individual entrepreneurs and country level secondary data. The primary data included in-depth interviews with entrepreneurs, as well as their self-ranking of constraints via a questionnaire. Findings emphasised the importance of government/regulatory and local market constraints. To contextualise these findings, we compared the individual-level findings to country-level conditions to assess whether they have any bearing on the entrepreneurs' perceptions of constraints. Country conditions may influence the entrepreneurs' perceptions of the demand for their products and/or services, and their opportunity and ability to supply these to customers. These may be influencing whether and how the entrepreneurs perceive and respond to opportunities to carry on with their renewable energy businesses.

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Introduction

Facilitating entrepreneurship has been touted as an important vehicle for promoting energy for sustainable development in developing countries (Reddy and Balachandra, 2006; Kooijman-van Dijk and Clancy, 2010; Vidican et al., 2012). But, being an entrepreneur is hard. Being an entrepreneur in a developing country is, arguably, even harder. Indeed, entrepreneurs in developing countries are no strangers to constraint. They face many obstacles to starting and running their businesses (see Amine and Staub, 2009; Antonites and Mungoni, 2011; Acheampong and Esposito, 2014; WorldBank and IFC, 2012). Yet, such countries have among the world's highest entrepreneurship rates (Xavier et al., 2012), and infrastructure and other support for start-up firms is improving (Radelet, 2010; Roxburgh et al., 2010; WorldBank and IFC, 2013). Many developing countries are considered factor-driven economies, characterised in the 2015/2016 Global Entrepreneurship Monitor as comprising mostly of subsistence enterprises, and a heavy reliance on unskilled labour (Kelley et al., 2016). In particular, the countries of sub-Saharan Africa are reported to have the highest proportion of early-stage entrepreneurial activity motivated by necessity, rather than opportunity (Kelley et al., 2012, 2016). Given these prevailing conditions, how, then, do entrepreneurs whose

livelihoods are built around a new, advanced technology and service industry, requiring highly skilled labour and technical knowledge, such as renewable energy, cope?

For the purpose of this research, we have derived a working definition of renewable energy entrepreneurship as the starting up, running and (potentially) growth of a new business venture (Walley et al., 2010) that focuses on the development, design, production and distribution of renewable energy, as well as renewable energy systems and technologies, including all aspects of the renewable energy value chain, comprising planning, consulting, financing, installation, maintenance and end of life management or disposal. Therefore, our definition of renewable energy entrepreneur (REE) represents a person who has started and owns a renewable energy business.

This paper explores the constraints and challenges faced by REEs in developing countries, focusing on the individual viewpoints of 42 such entrepreneurs in 28 developing countries. Building on previous work identifying entrepreneurship as a key driving force behind the development of the renewable energy industry in developing countries (Balachandra, 2011; Balachandra et al., 2010; Gabriel and Kirkwood, 2016), we ask the following questions:

- (1) How do REEs in developing countries perceive the importance of the constraints they face?
- (2) How are the REEs dealing with these constraints?

* Corresponding author.

E-mail address: cleanne.gabriel@otago.ac.nz (C.-A. Gabriel).

This enabled us to get a better understanding of the effect of regional constraints on entrepreneurial actions. The focus of our interviews was a discussion of one key aspect of the renewable energy institutional environment: challenges, specifically the constraints that the entrepreneurs view as restricting them. Thus, the paper starts with a brief outline of the literature in the area of seven key constraints. The material and methods used are presented next. Our findings and discussion then contribute to existing discussion and research in two ways. Firstly, we discuss implications for developing countries; our findings reveal logistical and strategic insights for nascent entrepreneurs in developing countries and for stakeholders interested in the role of entrepreneurship in improving the uptake of renewable energy technologies in these countries. Secondly, we contribute to ongoing discussions of the challenges and implications of doing business in countries characterised by necessity-motivated entrepreneurship.

Literature review

Basic dictionary definitions of the word 'constraint' describe it as something that limits or restricts and, conventionally, the use of the notion of constraint has had negative connotations. Scholarly research on constraint in management and organisation, as well as the literature on renewable energy constraints, is no exception and scholars have contemporarily focused their efforts on addressing and minimising the negative effects of constraints (see [Gibbert et al., 2014](#); [Pinkse and Kolk, 2007](#); [Rao and Drazin, 2002](#)). However, focusing on the ability of constraints to ruin a business or venture does not account for the mounting evidence to suggest that many firms (particularly new ones) find promising opportunities and survive ([Baker and Nelson, 2005](#); [Gibbert and Scranton, 2009](#); [Katila and Shane, 2005](#); [Van Burg et al., 2012](#)), or even prosper ([Xheneti and Bartlett, 2012](#)), under highly constraining conditions. It is with this failing in the logic of the argument that constraint is bad that the entrepreneurship literature has taken issue. Indeed, from an entrepreneurship perspective, it has been suggested that constraints play a dual role, as they both hinder and help the process of venture formation and growth ([Baker and Nelson, 2005](#); [Gibbert et al., 2007](#); [Katila and Shane, 2005](#); [Sarasvathy, 2001, 2004](#); [Senyard et al., 2014](#)).

Developing regions are consistently reported to be regions of factor-driven economies where entrepreneurs are characterised as being motivated by necessity, rather than opportunity, due to the constraining institutional environment ([Kelley et al., 2012, 2016](#)). We therefore focus on the idea that entrepreneurial action is influenced by institutional constraints ([Busenitz et al., 2000](#); [Casero et al., 2013](#); [Katila and Shane, 2005](#); [Van Burg et al., 2012](#)).

The setting in developing countries

Research focusing on developing regions has found institutional conditions to be unfavourable or constraining for entrepreneurship and business in general ([Bruton et al., 2013](#); [Manolova et al., 2008](#); [West et al., 2008](#); [Ault and Spicer, 2013](#)). Such constraining conditions include corruption and poor legal structures ([Adomako and Danso, 2014](#); [Gupta et al., 2014](#)), weak property rights ([Herrera-Echeverri et al., 2014](#)), and lack of access to information or education about how to start a new business ([Baumol et al., 2009](#); [Casero et al., 2013](#)). In many developing countries, the current fossil fuel-dominated system acts as a hindering force with respect to the uptake of renewable energy technologies (RETs) ([Chendo, 1994](#); [UNEP, 2012](#)). Unlike many other parts of the world, though, such countries have unsupportive legal, institutional and market frameworks, which means that proponents and agents of renewable energy are faced with additional challenges with respect to stimulating and developing new institutional structures that are more supportive of RETs. In developing countries, some of the most common challenges constraining the uptake of RETs include inadequate access to institutional finance ([Ernst and Young, 2011](#);

[Foster-Pedley and Hertzog, 2006](#)), low demand ([Martinot et al., 2002](#)), relatively high prices ([WorldBank, 2008](#); [Wüstenhagen and Boehnke, 2008](#)), lack of skilled labour ([Alazraque-Cherni, 2008](#); [Reddy and Painuly, 2004](#)), underdeveloped physical infrastructure ([Glemarec, 2012](#); [Monroy and Hernández, 2008](#)), inadequate government or policy support ([Gboney, 2009](#); [UNEP and Bloomberg, 2016](#)), and the presence and power of incumbents ([UNEP, 2012](#)).

Of the 189 countries included in the International Finance Corporation's (IFC) 2013 ranking of the ease of doing business, sub-Saharan African countries fared extremely poorly, with an average ranking of 140 and characterisation as having weak legal institutions and complex regulatory processes ([WorldBank and IFC, 2013](#)). Indeed, the developing countries¹ that represent the home bases of the entrepreneurs in this study generally received low rankings in the World Bank's latest ease of doing business index: Barbados (119), Belize (120), Cambodia (127), Cameroon (172), Chile (48), Costa Rica (58), Ecuador (117), Ethiopia (146), Fiji (88), Ghana (114), Guatemala (81), India (130), Indonesia (109), Kenya (108), Lao PDR (134), Nigeria (169), Panama (69), Papua New Guinea (145), Philippines (103), Senegal (153), South Africa (73), Tanzania (139), Thailand (49), Tonga (78), Trinidad and Tobago (88), Uganda (122) and Zambia (97) ([WorldBank, 2016a](#)). The only exceptions were Somalia (which was not included in the ranking) and some newly emerging Latin American countries, where business infrastructure and other conditions are improving noticeably ([WorldBank, 2016a](#)). Based on the literature, seven key constraints were identified as potentially affecting REEs in developing countries. Each of these is discussed in turn in the following section.

Key constraints

Seven constraints were identified as key to REEs' success (or, conversely, failure) in developing countries: *Inadequate or inappropriate government or policy support*, *Inadequate local demand*, *Price of RETs*, *Inadequate access to institutional finance*, *Lack of skilled labour*, *Underdeveloped physical infrastructure and logistics* and *Power of incumbents (existing players on the energy market)*. Our categorisation of findings from the literature into seven challenges was strongly influenced by [Gabriel's \(2016\)](#) review, which presented the findings from a qualitative meta-analysis of the renewable energy and management/entrepreneurship literatures on constraint in developing countries. At the start of our study, we approached participants with these seven challenges with a view to confirming whether they were also important to these entrepreneurs, and uncovering any other challenges we might have missed.

Researchers in developing countries have found that government and public entities have direct involvement in the affairs of local business people ([Child and Tsai, 2005](#); [Ince et al., 2016](#); [Zhou and van Witteloostuijn, 2010](#)). This is especially the case for renewable energy businesses, as this new and emerging technology has been the focus of a considerable amount of international aid and assistance ([Dornan and Shah, 2016](#); [Martinot, 2001](#); [Martinot et al., 2002](#)). While indeed this has helped, some (such as [Dornan and Shah, 2016](#) for example) consider this kind of government intervention as stifling to the natural growth and uptake of RETs in developing countries. It has been argued that, in order to ensure that the uptake of RETs in such countries is lasting and sustainable, efforts must be made to ensure that the right market incentives ([Rickerson et al., 2013](#)) and business models ([Aslani and Mohaghar, 2013](#); [Gabriel and Kirkwood, 2016](#); [Wüstenhagen and Boehnke, 2008](#)) are encouraged. Badly planned or unmeasured public

¹ It should be noted that the sample of entrepreneurs for this study was based on their doing business in countries we characterised as 'developing countries'. We referred to the countries listed in 'Table E' (list of "emerging and developing economies") in the International Monetary Fund's (IMF) 2012 World Economic Outlook (WEO) Report ([IMF, 2012](#)) pp. 182–183 when making this distinction.

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