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ORIGINAL PAPER

Social Enterprise Innovation: A Quantitative Analysis of Global Patterns

Thema Monroe-White[1] · **Sandy Zook**[2]

Abstract Social enterprise and innovation are inextricably linked in the literature (Chell et al. in Entrepr Reg Dev 22(6):485–493, 2010; Dees in Harv Bus Rev 76:54, 1998; Light in Stanf Soc Innov Rev 4(3):47–51, 2006). To date, research on social enterprise innovation has predominantly focused on micro-level factors, such as the social entrepreneur or organizational attributes. Inversely, recent empirical advances on social enterprise find a country's social enterprise sector is influenced by macro-institutional factors, including form of government, stage of economic development, culture and model of civil society (Monroe-White and Coskun, in: Shaping social enterprise: understanding institutional context and influence, Emerald Publishing Limited, London, pp 27–48, 2017). Given the link between social enterprise and innovation, recent empirical findings around social enterprise beg the question, do macro-institutional factors similarly predict innovation by social enterprises? This paper uses a hierarchical linear model to examine the influence of national-level variables on social enterprise innovation. Results indicate that similar to social enterprise, macro-institutional factors predict social enterprise innovation. More specifically, macro-institutional factors influence the various types of innovations (product, process and marketing) differently. Moreover, country-level innovation is traditionally defined by economic factors, such as R&D funding and STEM workforce, however, these factors do not help explain social enterprise innovation. Given the social aspects of social enterprise innovation, to capture the full scope of innovation within countries, expanded definitions of national-level innovation should be considered.

Keywords Social enterprise · Innovation · Entrepreneurship · National Innovation Systems

Introduction

Historical perspectives on economic development emphasize innovation as a driver to achieving economic and social prosperity (Lundvall 1992; Nicholls and Murdock 2012). From a macro-institutional perspective, innovation is not only viewed as a mechanism for social entrepreneurs to solve social and environmental problems, but as a driver to improve a country's economic and social welfare competitiveness globally (Sala-i-Martin 2010). Indeed, at the national-level innovation is the considered the primary means whereby countries gain competitive economic advantage over their counterparts (Feinson 2003; Sala-i-Martin 2010). Globally, countries are often evaluated based on their ability to close development gaps along several economic and social measures (Fagerberg and Godinho 2005; Sala-i-Martin 2010).

In the social enterprise literature, there is a stated assumption that social enterprises are inherently innovative in solving challenging social and economic problems (Chell et al. 2010; Dees 1998; Light 2006). This school of thought describes social entrepreneurs as change makers, innovators and pattern breakers, whose activities result in societal-level transformational changes or new social

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equilibriums (Dees 1998, 2003; Light 2006; Defourny and Nyssens 2010; Nicholls and Murdock 2012; Young 2013; Young and Lecy 2014). Moreover, organizational innovation gives organizations a competitive advantage over rivals and helps ensure financial sustainability. Innovation, however, is not only the result of individuals or organizations searching for opportunities, but is influenced by the environment, or macro-institutional context, in which these individuals and organizations operate.

Countries are increasingly facing pressure to create cultures for innovation and encourage socially responsible behavior by organizations and entrepreneurs (Leadbeater 2007; Osborne and Brown 2011; Rivera-Santos et al. 2015; Urbano et al. 2010). Examinations of institutional factors influencing the development of social enterprise, however, are predominantly relegated to policy innovation around legal forms (Austin et al. 2006; Borzaga and Defourny 2001; Defourny and Nyssens 2017; Fowler 2000; Townsend and Hart 2008), or are country-level analyses (Wu et al. 2017; Rinkinen et al. 2016; Rao-Nicholson et al. 2017; Roy et al. 2015; Turker and Vural 2017; Surie 2017; Urbano et al. 2010). This paper takes the next step in this line of inquiry, combining research streams on National Innovation Systems (NIS) and macro-institutional factors influencing social enterprise innovation, including form of government, economy type, cultural factors and model of civil society. A hierarchical linear model (HLM) is used to examine two research questions. First, while it is generally agreed upon in the literature that innovation is predominantly at the organizational level, does accounting for macro-institutional factors help explain variation in social enterprise innovation across countries? Second, if so, are there macro-institutional factors that facilitate or limit a social enterprise's ability to innovate?

The findings contribute to a broader understanding of macro-institutional factors that influence the development of social enterprise innovation, beyond a focus on government policies. In line with literature on innovation, the HLM model finds that most innovations are nested at the organizational-level; however, even accounting for organizational attributes, there is a statistically significant portion of innovation explained by examining country-level macro-institutional factors. That is, accounting for macro-institutional factors provides a more complete picture of the influences on social enterprise innovation. More specifically, when examining and evaluating the impact of social enterprise innovation, indicators should go beyond tradition science and technology indicators, such as research and development investments and science, technology, engineering and mathematics (STEM) workforce). Findings contribute empirical support for understanding the role of macro-institutional factors on the development of social enterprise innovation across countries and regions, as well as useful insights for practitioners and multinational organizations interested in engaging in, facilitating and measuring innovation across countries.

In order to operationalize the model, we draw on similar research that examines differences in the social enterprise sector across countries. Specifically, Kerlin's Macro-Institutional Social Enterprise (MISE) Framework draws on institutional theory to explain differences in the size and characteristics of the social enterprise sector across countries. The MISE framework is supported by recent empirical work using hierarchical linear models that find the size and conceptualization of the social enterprise sector vary across countries based on macro-institutional factors including: form of government, stage of economic development, culture and model of civil society (Kerlin et al. 2016; Monroe-White and Coskun 2017).

The country-level variables from Kerlin's (2009, 2013) macro-institutional social enterprise (MISE) framework are combined with the innovation and opportunity indicators from the NIS literature to examine the impact of country-level and organizational factors on social enterprise innovation. Hierarchical linear modeling (HLM) combines the Global Entrepreneurship Monitor (GEM) survey data with large multinational datasets from sources such as the World Bank World Development Index, World Governance Indicators and World Economic Forum's Global Competitive Index. This allows for analysis of the relationship between social enterprise organizations operating within national systems of innovation.

The next section outlines the NIS framework, defines key terms and presents the hypotheses. The "Methodology and Data" section outlines the methodology, including the data sources used and is followed by a summary of findings. Lastly, implications and directions for future research are provided.

Background

Social entrepreneurs operate in an environment of complex problems and growing inequalities that contribute to social and environmental challenges. Social problems or issues are loosely defined as those long-standing societal concerns (such as poverty elimination, access to health care, decent sanitation, and quality education) that have come about as a result of neglected areas of development in industrialized and emerging nations alike. Despite this general agreement, social enterprise is conceptualized differently across country and regional contexts (Borzaga and Defourny 2001; Dacanay 2004; Defourny and Nyssens 2008, 2010; Nyssens 2006; Galera and Borzaga 2009; Kerlin 2006, 2009, 2017; Bacq and Janssen 2011; Kerlin et al. 2016; Young et al. 2016). Overlapping and competing

definitions of social entrepreneurship and social enterprise have been the source of extensive dialogue and debate (Defourny and Nyssens 2012; Light 2008). We follow Kerlin's (2013) definition of social enterprise, that social enterprises are nongovernmental organizations using market-based tactics to solve social issues. This definition of social enterprise is flexible enough to allow social enterprise characteristics (legal formation, reliance on commercial revenue and social issue focus, etc.) to vary in distinctive ways based on their institutional context, which aligns with the MISE framework (Monroe-White et al. 2015).

The MISE framework compares social enterprises across seven world regions and multiple countries finding that social enterprise varies in predictable ways. Drawing on historical institutionalism, MISE asserts country models of social enterprise are influenced, and continue to be shaped, by a mix of culture, government, economy type, culture and civil society. Sala-i-Martin (2010) identifies three types of economies (factor-driven, efficiency-driven and innovation-driven), asserting that entrepreneurship manifests differently across these three types. Entrepreneurship is more informal in factor-driven economies, housed in small- to medium-sized enterprises in efficiency-driven and larger organizations in innovation-driven economies. Combining economy type with government, Salamon and Sokolowski (2009, 2010) identify five models of civil society. Three of the models are found in developed economies and influenced by the structure of the welfare state, while the other two models are more influenced by the type of government. This leads to several hypotheses within the MISE framework that sources of variation in social enterprise development across countries are attributed to a combination of socioeconomic factors (GDP, international aid, education spending, corruption perception, civil liberties activity and state capabilities) which in turn shaped organizational characteristics (outcome emphasis, program area focus, legal framework and organizational type, social sector and strategic development base) of the social enterprises in each geographical setting (Kerlin 2009, 2013). The MISE framework also identifies cultural attributes, particularly collectivism and uncertainty avoidance, as an influence on social enterprise development. Tiessen (1997) and Shane (2007) find collectivism/individualism and uncertainty avoidance are not only linked to entrepreneurial variation, but innovation as well.

In total, the MISE framework asserts that a larger welfare state and higher level of economic competitiveness and stronger governance systems lead to a larger social enterprise sector. Moreover, low uncertainty avoidance and low collectivist cultural dimensions also lead to a larger social enterprise sector. Empirical testing of the MISE framework found that country-level factors accounted for almost half the variance in the size of a country's social enterprise sector (Monroe-White et al. 2015; Monroe-White and Coskun 2017). These empirical tests used hierarchical linear models and found support for the hypotheses that the economic competitiveness rank, size of the welfare state and collectivist cultural orientation (Monroe-White et al. 2015; Monroe-White and Coskun 2017). Given the links between social enterprise and innovation in the literature, drawing on the empirical support for the MISE framework, this leads to two primary hypotheses:

- **H1** Similar to findings of the MISE framework on the size of the social enterprise sector; social enterprise innovation varies by country.
- **H2** There will be more social enterprise innovation in countries with particular macro-institutional characteristics: strong welfare state (public spending on education and health), strong governance system (effectiveness, regulation corruption, rule of law), low uncertainty avoidance and low collectivist values and high economic competitiveness.

Similar to the MISE framework, the NIS literature recognizes macro-institutional characteristics shape micro-level factors. Unlike the MISE, NIS examines the role of these factors on innovation, finding economic competitiveness to be a product of several interrelated institutions (e.g., financial, educational, cultural, historical) (Lundvall 1992; Nelson 1993). NIS recognizes that firms interact with other organizations such as other firms, universities, research centers, government agencies and financial institutions to engage in the process of innovation. Moreover, organizations are made up of individuals operating and learning collectively in specific environmental contexts to achieve specified goals (Hatch and Cunliffe 2006). Consequently, environmental factors such as national policies, laws, regulation, historical backgrounds and cultural norms all present opportunities and obstacles for increased entrepreneurial activity.

The NIS literature has primarily focused on for profit legal forms, neglecting other legal forms that also contribute to welfare gains and taking for granted the various other types of organizations that contribute to national economic and social welfare. Although there are debates and growing calls internationally as to whether investments in S&T capture the full range of innovation present across all sectors, to date the NIS remains a dominant paradigm in the evaluation of country-level innovation. As such, the science, technology, engineering and math (STEM) educated workforce, patents and R&D expenditures are often used to determine if a country's NIS is functioning like the highly industrialized nations or the extent to which states

seek to promote innovation for economic growth (Johnson et al. 2003). Thus, NIS provides a narrow definition of innovation, asserting that a country's innovation capacity is a combination of several interrelated science and technology (S&T) indicators. However, a growing body of research applies the NIS framework to social enterprise, finding that country and regional level factors can deter or facilitate social enterprise or social entrepreneur innovation (Wu et al. 2017; Rinkinen et al. 2016; Rao-Nicholson et al. 2017; Turker and Vural 2017; Surie 2017).

Given NIS's emphasis on conventional organizational forms (e.g., profit maximizing) and technological innovations, it is not clear if social enterprises will respond to these same incentives, nor is it clear if these S&T indicators effectively predict the presence of social enterprise innovations. This leads to an additional hypothesis:

- **H3** There will be more social enterprise innovation in countries with high innovation capacity (STEM workforce, Patents).

Social Enterprise Innovation and Opportunity Recognition

This paper does not argue that all social entrepreneurs are innovative, nonetheless, social entrepreneurship and innovation have been inextricably linked in the literature (Chell et al. 2010; Dees 1998; Kerlin 2010; Light 2006). Central to innovation is opportunity recognition, which encompasses the act of opportunity discovery, as well as opportunity creation (Alvarez and Barney 2007; Baron 2006; Dyer et al. 2008; Ozgen and Baron 2007; Shane 2007; Shane and Venkataraman 2000). In the conventional entrepreneurship literature, opportunities are created when entrepreneurs construct new combinations, or recombine resources to generate a new means-end framework and produce a profit (Shane 2007). For social enterprise though, opportunities must be more broadly defined to encompass both for profit and non-profit goals, and when exploited at the right time, lead to favorable outcomes in both social and economic benefits (Dees 1998; Guo and Bielefeld 2014; Kickul and Lyons 2012). Therefore, the opportunity dimension is conceivably the most important concept in distinguishing social from commercial enterprises in that it outlines the explicit function of the mission of an enterprise in addressing market failure (Austin et al. 2006). As such, we hypothesize that:

- **H4** There will be more social enterprise innovation in countries with a strong commercial market sector and more social and environmental opportunities.

Opportunity recognition can be a deeply personal experience to the social entrepreneur and vary greatly across contexts (Guo and Bielefeld 2014). Thus we use proxies for capturing the possibility for these opportunities by drawing on several multinational datasets. Social opportunities are captured using the Human Development Index (HDI) which measure quality of life and the GINI Index. Income inequality has been linked to the economic and social wellbeing of a nation (Anand and Segal 2008; Cozzens and Kaplinsky 2009; Sen 1999), and to national innovation policy in particular (Cozzens et al. 2002). It is also worth recognizing that income inequality is merely one form inequality, and does not capture the multidimensional nature of the concept (Cozzens 2007). The social opportunities serve as a counter-position to the S&T indicators in the model Environmental needs are captured using the environmental performance index (EPI), as it measures the environmental needs of a country. As hybrid entities, social enterprises may seek out opportunities to compete in commercial markets, so market size is measured as gross national income (GNI) per capita. Operationalization of commercial, social and environmental opportunities is discussed in greater detail in the next section, "Methodology and Data".

Research on innovation has focused on trying to define it or understand the nature of innovation within specific contexts (Andersson and Ford 2016; Dietrich et al. 2016; Montgomery 2016; Roy et al. 2015). Because innovation can take many forms and functions, there is not one agreed upon definition (Guo and Bielefeld 2014; Montgomery 2016; Nicholls and Murdock 2012). For the purpose of this study, we draw on the Oslo Manual (Tanaka et al. 2005, p. 46) definition: "The implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations." Unlike technological definitions of innovation this broader definition recognizes the multiple ways for organizations to create value and effectively adapt to changing environmental conditions (i.e., increased competition, changing market demographics, policy changes or external shocks). In order to operationalize and ground the definition specifically in the social enterprise innovation literature, we build on the Oslo manual's definition of innovation, as well as Kerlin's (2013) definition of social enterprise and Guo and Bielefeld's (2014) review of social entrepreneurship innovation literature. Social enterprise innovation is a new or improved product (good or service), process, marketing method or organizational methods developed and/or implemented through nongovernmental, market-based approaches to address social issues. For the HLM model, innovation is operationalized and categorized in three categories: product, process or marketing innovation. How these concepts are drawn from the Global

Entrepreneurship Monitor (GEM) survey are addressed in more detail in the "Methodology and Data" section.

Methodology and Data

Answering the research questions and hypotheses above, requires organizational and country-specific information; therefore, hierarchical linear modeling is used to determine the probability of a social enterprise being innovative within a country based on country-level characteristics. The dataset was compiled from multiple secondary data sources including the Global Entrepreneurship Monitor (GEM), World Bank Development Index, World Economic Forum and World Health Organization (WHO).

The dependent variables are drawn from the 2009 GEM survey; the only year GEM was expanded to capture information on social enterprise and social enterprise innovation (Bosma et al. 2012). GEM is administered as a general population survey of adults between 18 and 64 years of age; it is designed to capture national entrepreneurship rates and individual-level characteristics of nascent and existing entrepreneurs. Every country included includes at least 2000 respondents, for a total of 181,074 individual respondents in 54 countries (Bosma et al. 2012). "Appendix 1" includes a list of countries and within country samples.

Due to respondent anonymity, however, responses are unverifiable. This means that there are some inherent limitations with regard to validity testing of GEM data. For example, if some individuals claim to be the owner of a social enterprise organization, we are unable to objectively verify if the organization actually exists (i.e., via official company registrations), or in the case of social enterprise innovation, if the organization actually produced a new product, process or marketing innovation (i.e., patent registrations or customer surveys).

To mitigate some of these challenges, we restricted the analysis to cases of owner/manager/founders of existing organizations as opposed to nascent entrepreneurs. These respondents are by definition more likely to report on existing (or already occurred) entrepreneurship and innovation activity. Although restricting the data in this way reduced the overall number of cases at the organizational level (by 238 nascent SEs), it simultaneously improved the overall trustworthiness and reliability of the data being analyzed.

Additionally, because this analysis focuses on social enterprise innovation, we also needed to distinguish social enterprises from conventional businesses and social organizations. Conventional businesses are operationalized as businesses without an explicit social issue focus but that generate commercial sales revenue. Social organizations have an explicit social issue focus, but do not generate commercial sales revenue. Lastly, social enterprises are operationalized as organizations with an explicit social issue focus that also generate commercial sales revenue. Of the GEM respondent data, 13.7% (24,759) of individuals currently owned or managed an organization or business. Of that 13.7%, 5% (1146) of respondents were identified as social enterprises across 36 countries. The authors verified that there were no fewer that 5 social enterprises identified for any given country in order to ensure that there were enough observations to conduct the analyses. The remainder were either traditional social organizations (1510) or conventional businesses (22,103). Frequencies and percentages for these data are presented in Table 1.

Dependent Variable: Social Enterprise Innovation

Social enterprise innovation data were also drawn from the GEM survey. Consistent with the Oslo Manual definitions, three types of innovation are captured from five GEM variables: product, process and marketing innovation. Product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics. Process innovation is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software. Finally, marketing innovation is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing with the objective of increasing sales. New marketing methods in product promotion involve the use of development and introduction of a fundamentally new brand symbol (as distinguished from a regular update of the brand's appearance) which is intended to position the firm's product on a new market or give the product a new image. Construction and definitions of the product, process and marketing innovations are provided in "Appendix 2."

Table 2 outlines the innovation types and number of innovations by organization type identified in GEM. Approximately 71% of the social enterprises in our sample

Table 1 Organization types

Organization type	Frequency
Social enterprise	1146
Social organization	1510
Conventional business	22,103

Table 2 Frequencies and percentages on social enterprise innovation

Types of innovation	Social enterprises		
	No *N* (%)	Yes *N* (%)	Total *N*
Product innovation	726 (64%)	404 (36%)	1130
Process innovation	585 (53%)	529 (48%)	1114
Marketing innovation	456 (41%)	661 (59%)	1117

	None *N* (%)	One *N* (%)	Two *N* (%)	Three *N* (%)	Total *N*
Number of innovations	336 (30%)	263 (23%)	265 (23%)	267 (24%)	1131

reported at least one type of innovation, with most innovations in marketing (661; 59%). A dichotomous (success, failure) variable was constructed to capture overall innovative vs. "non-innovative" social enterprises. If the respondent replied 'yes' to any one of the three innovation types, (i.e., regardless of whether the innovation was product, process or marketing) they are innovative, if on the other hand none of the innovation types was selected, the social enterprise was not innovative. Because social enterprises could report multiple types of innovation, an additional four factor categorical variable was also developed capturing none, one, two or three types of innovations.

Independent Variables

Using Kerlin's (2013) MISE framework and Monroe-White et al.'s (2015) operationalization of variables within this framework, country-level institutional variables included were welfare state, governance, economic competitiveness, culture and international aid. Unfortunately, civil society was unable to be included in the analysis due to a high level of missing data across countries available for analysis.

Also considered are the influence of two additional country-level constructs on social enterprise innovation: entrepreneurial opportunities and innovation capacity. The number of countries with available data varies between each indicator, making cross-country comparisons a challenge, and missing values were avoided as much as possible by using the closest available annual data. The majority of the variables in this study are from the World Bank's World Development Index (WDI) (World Bank Group 2012), including social and commercial business opportunity variables, the size of the welfare state, and innovation capacity (Table 3).

Welfare State

The welfare state uses two variables identified in Kerlin (2009, 2013) and is drawn from the WDI: expenditure on public health and public education. Public health expenditure is calculated as recurrent and capital spending including donations from international agencies or NGOs from the World Health Organizations Global Health Expenditure Database. Public education expenditure captures the percent of Gross National Income (GNI) that is spent of public education operating expenditures including wages and salaries at all levels of government from the UNESCO Institute of Statistics.

Governance

Following Monroe-White et al. (2015), governance was constructed from four dimensions of the World Governance Indicators including: government effectiveness, regulatory quality, rule of law and control of corruption.

Economic Competitiveness

Economic competitiveness is measured using the World Economic Forum's Global Competitiveness Index which ranks countries according to a weighted system of pillars and indicators. These pillars are used to place countries within three broad stages of national economic growth: factor (stage 1), efficiency (stage 2) and innovation-driven (stage 3) economies (Sala-i-Martin 2010).

Culture

Culture is measured using uncertainty avoidance and in-group collectivism from the Global Leadership and Organizational Behavior Effectiveness Research Program (GLOBE) Values Survey. Uncertainty avoidance and in-group collectivism are most closely related to entrepreneurship (Kerlin 2009, 2013). Uncertainty avoidance is the extent to which a society, organization, or group relies on social norms, rules, and procedures to alleviate unpredictability of future events. In-group collectivism measures the degree to which individuals express pride, loyalty, and cohesiveness in their organizations or families.

International Aid

International aid is constructed as the net official development assistance (ODA) per capita, that is, the flow of official and private financial contributions from the members of the Organization for Economic Co-operation and Development (OECD) to developing economies.

Table 3 Mean, standard deviations, range and skewness for country data

Variable	*N*	Min	Max	*M*	SD	Skew
Welfare state						
Public education	48	0.80	7.70	4.70	1.42	− 0.62
Public health	48	1.30	8.70	4.68	2.18	0.20
Governance						
Effectiveness	54	− 1.32	2.24	0.45	0.95	0.17
Regulation	54	− 1.64	1.98	0.43	0.93	− 0.28
Corruption	54	− 1.15	2.47	0.34	1.06	0.55
Rule of law	54	− 1.60	1.96	0.32	1.00	0.14
Economic competitiveness						
GCI rank	49	1.00	120.00	47.94	33.15	0.30
Culture						
Uncertainty	29	3.24	5.36	4.58	0.58	− 0.71
In-group collectivism	29	3.53	6.03	5.03	0.72	− 0.61
International aid						
International aid	54	0.00	686.77	37.09	105.31	4.95
(log) International aid[a]	54	0.00	6.53	1.69	1.92	0.76
Innovation capacity						
R&D	46	0.02	4.77	1.27	1.16	1.14
STEM workforce	42	39.44	7689.31	2252.46	2120.94	0.97
Patent	47	7.00	456,321.00	33,364.23	96,627.93	3.52
(log) Patent	47	1.95	13.03	7.70	2.40	0.29
Entrepreneurial opportunities						
HDI	53	0.00	1.00	0.78	0.12	− 0.88
Environment	50	34.58	77.80	55.87	9.94	− 0.21
Ease of doing business	54	3.00	164.00	65.22	43.03	0.19
Gross national income	52	380.00	85,580.00	20,112.88	20,207.89	1.14
Income inequality	41	25.79	67.40	40.84	9.37	0.66
Controls						
Total population	54	102,947	1324,655,000	58,007,443	183,380,764	6.50
(log) Total pop.	54	11.54	21.00	16.54	1.60	− 0.24

[a]International aid was transformed by adding 10.35 to each value so that there were no negatives when the natural log was taken

Innovation Capacity

In order to measure innovation capacity at a national-level, previous studies emphasized expenditure on research and development and the size of the science, technology and engineering (STEM) workforce (Furman et al. 2002). The research and development (R&D) expenditure variable measures capital expenditures and current costs (i.e., wages and costs of researchers, technicians and supporting staff, materials, supplies or other equipment, subscriptions to libraries and laboratories) on work undertaken to increase knowledge and new applications resulting from knowledge gains (World Bank Group 2012). The STEM workforce variable measures the number of researchers per thousand labor force in full time equivalent hours. The number of patents variable, measures actual as opposed to potential national productivity.

Entrepreneurial Opportunities

Social enterprises are expected to seek out and exploit social and/or environmental opportunities alongside commercial ones to achieve their goals. Thus, three types of opportunity variables are included in the model: social, environmental and commercial opportunities. The Human Development Index (HDI) serves as a proxy for social opportunities, as it is designed to measure quality of life. HDI is a composite index measuring: life expectancy at birth, mean years of schooling (adults), expected years of schooling (children) and GNI per capita (PPP USD). The environmental performance index (EPI) is a proxy for the

environmental needs of a country. EPI is a composite index of 22 indicators, ranking countries on performance indicators that cross policy categories of environmental public health and ecosystem vitality including: the environmental burden of disease; air pollution (effect on humans) and (effects on ecosystem); water (effects on humans) and (effects on ecosystem); biodiversity and habitat; agriculture; forestry; fisheries and climate change (de Sherbinin et al. 2013). As hybrid entities, social enterprises may seek out opportunities to compete in commercial markets. Market size, measured as gross national income (GNI) per capita, is used as a proxy for commercial opportunities. GNI per capita (formerly GNP per capita) is the gross national income, converted to US dollars using the World Bank Atlas method, divided by the midyear population. Finally, as an additional proxy for social opportunities we include an income inequality variable, measured by the GINI Index. It is included in this analysis as an alternative to social opportunities, because of its significant influence in economic development and S&T policy.

Analysis

Hierarchical linear modeling (HLM) or multilevel modeling (MLM) is a statistical technique that is used to discern patterns and relationships that link values at one level of analysis (organizations) to factors at a higher unit of analysis (countries). The dependent variable, social enterprise innovation, is dichotomous and requires the use of logistic hierarchical generalized linear model (Logit HGLM). Logit HGLM, like logistic regression, allows for non-normally distributed predicted values by modeling the odds of success and the effects of the explanatory variables on these odds (O'Connell and McCoach 2008; Raudenbush and Bryk 2002; Snijders and Bosker 2012). We utilize a typical two-level mixed model assigning organizations to level-1 and countries to level-2. Grand-mean centering is used for all level-2 predictors because this analysis is interested in the level-2 relationships while controlling for the level-1 covariates (Enders and Tofighi 2007). When the probability of innovation is greater than the probability of failure to innovate, the odds are greater than one and if the probability of innovation is less than the probability of failure, the odds are less than one; otherwise if the outcomes are equally likely the odds are one.

The extent to which organizations in a country are similar to one another is measured through the intraclass correlation coefficient (ICC). The ICC is the explained variance in the dependent variable divided into between-group and within-group components. The ICC value represents the proportion of the variables that is explained by between-group components. If data are completely dissimilar or independent from each other within a group then the ICC score will be 0 (i.e., social enterprises in a particular country do not share similar characteristics). If, on the other hand social enterprises within a group are similar, the ICC will have a positive value. If clustering is ignored, it means that the distinctions between within and between-group variance are not accounted for. As a result the estimated variance from the sample tends to be smaller than would be expected if the clustered nature of the data had been preserved. Ignoring the clustered nature of the data increases the likelihood of Type I errors compromising the validity of results and inferences drawn to the population because variance estimates (and thus standard errors) are too low (Alemdar 2008; O'Connell and McCoach 2008). Given that our data are nested, and to avoid Type I errors, we constructed a typical two-level mixed model assigning organizations to level-1 and countries to level-2 making HLM is an appropriate technique capable of discerning whether key explanatory variables take place at the macro-institutional or organizational-level.

Missingness at level-1 and level 2, as well as issues of multicollinearity were carefully considered prior to analyzing each research question and hypothesis. The two culture variables (uncertainty avoidance, and in-group collectivism) had almost half (46%) of the data missing. First, to check if values were completely missing at random (MCAR), the Little MCAR test was conducted, and the results were not significant. Thus, the data were missing completely at random and multiple imputation techniques involving the sequential estimation of missing values, were used in order to prevent the dropping of key variables in the analysis. As a further check for biased estimates, the imputed values were compared to non-imputed values to identify significant differences (Goodman and Blum 1996; Little and Rubin 2002). Skewness was also examined to assess for normality. International aid, patents, and total population were all highly skewed. These variables were transformed via a natural log transformation before performing the analyses.

Results

It was hypothesized that country-level factors would explain a significant amount of variation in social enterprise innovation. A mixed model ordinal logistic regression assessed if institutional variables including: economic competitiveness (GCI.Rank), welfare state, governance, uncertainty avoidance, in-group collectivism, international aid, research and development, STEM and patents predicted the occurrence of social enterprise innovation while controlling for total population. All of the predictors were

first treated as fixed effects, then the three innovation capacity variables (i.e., research and development, STEM, and patents) were added. Multicollinearity among the predictors was assessed and variables with large variance inflation factors (VIFs) were removed, including: governance (51.00), economic competitiveness (42.51), in-group collectivism (21.77), and STEM (21.32). After eliminating issues of multicollinearity, welfare state, uncertainty avoidance, international aid, research and development, and patents were used as the main predictors of social enterprise innovation while controlling for the total population of the country.

Empty Model

An empty model was run to test the first hypothesis that social enterprise innovation varies across countries. The empty model partitions the variability in the data between the two levels (organizations and countries) to determine if there is sufficient variability in the intercepts across groups (i.e., countries) to support additional testing. If there is not sufficient variability when clustering by country, then multilevel modeling is unnecessary. Given the small sample size (i.e., fewer than 100 country cases), a Satterthwaite[1] approximation was used, along with a robust estimation of the fixed effects, which is useful in smaller sample sizes (Heck et al. 2013).

Results of the empty model found a significant estimate of variation in the intercept by country. In logistic HGLM, the intraclass correlation is calculated as the variance between countries divided by the variance between countries plus 3.29 or ($\pi^2 \div 3$) (Snijders and Bosker 2012). That is, using Table 4, nesting social enterprise innovation (Estimate = 0.44, $z = 2.44$, $p = 0.015$) by country accounts for 11.8% of the variation in social enterprise innovation across organizations. The same models were conducted to test product, process and marketing innovation. Similarly, nesting by country accounted for 6.8% of the variation in process innovation and 12.3% of the variation in marketing innovation. Although process innovation was not significant at the 0.05 significance level, we note that there was a 9.1% variance in product, with a p value of 0.059 for process innovation. Given the significant results of the empty model, we proceed to testing Hypotheses 2 and 3, that examine the role of specific macro-institutions within countries on social enterprise innovation.

[1] A Satterthwaite approximation is useful when level-2 units vary considerably in size. Specifically, it corrects for calculating degrees of freedom providing a more conservative estimate of standard errors.

Table 4 Empty model results

Variable	*B*	*z*	*p*
Social enterprise innovation	0.44*	2.44	0.015
Product innovation	0.33**	1.89	0.059
Process innovation	0.24*	2.02	0.043
Marketing innovation	0.46*	2.59	0.010

*$p < 0.05$; **$p < 0.10$

Random Intercepts: Institutions

Two mixed model binary logistic regressions assess if institutional effects (i.e., welfare state, governance, uncertainty avoidance, international aid, R&D, STEM and patents) or opportunities (i.e., social, environmental and commercial opportunities, and inequality) predict the type of innovation (product, process, or marketing) in social enterprise organizations. Focusing on social enterprise innovation limits the analysis to 34 countries and 1033 social enterprises with valid innovation response. See "Appendix 1" for a detailed list of countries included in this part of the analysis.

Table 5 outlines the results of the reduced models, where the intercepts for product and marketing innovations were significant, but not the intercept for process innovation. Using odds ratios from Table 5, a social enterprise in a country with an average welfare state, uncertainty, international aid, research and development, patents and population were 1.53 times more likely to have a product innovation than not have one. The opposite effect was found for marketing innovations; thus, a social enterprise in a country with an average welfare state, uncertainty, international aid, research and development, patents and population is 1.49 (1/0.67) times more likely to not have a market innovation than to have one. Moreover, welfare state was a significant predictor of marketing innovation, suggesting that as spending on education and public health increased, the likelihood of having a market innovation decreased. Lastly, as total country population increased, the likelihood of having a marketing innovation also increased. No other significance was found among the other fixed effects in any models.

Random Intercepts: Opportunities

Three additional models were conducted to assess if the opportunity variables predicted the innovation types. Results find a significant intercept for process innovation ($B = -0.38$, $p = 0.040$, OR = 0.69), suggesting that a business in a country with an average social,

Table 5 Reduced model with institutional variables predicting social enterprise innovation types

Source	Product		Process		Marketing	
	B	OR	*B*	OR	*B*	OR
Intercept	0.42*	1.53*	− 0.11	0.89	− 0.40*	0.67*
Welfare state (GMC)	0.05	1.05	0.02	1.02	− 0.17*	0.84*
Uncertainty (GMC)	0.02	1.02	0.04	1.04	− 0.22	0.80
(log) International aid (GMC)	0.11	1.12	0.06	1.06	0.03	1.04
Research and development (GMC)	0.17	1.18	0.31	1.36	0.59	1.81
Patents (GMC)	0.00	1.00	0.00	1.00	0.00	1.00
(log) Total population (GMC)	0.12	1.13	0.19	1.21	0.21*	1.23*

*$p < 0.05$

environmental, and commercial opportunity, and average income inequality was 1.45 times more likely to not have a process innovation than to have one. The intercept was also significant for marketing innovation, such that a business in a country with an average welfare state, uncertainty, international aid, research and development, patents and population was 1.79 times more likely to not have a marketing innovation than to have one. No other significance was found among the fixed effects in any models. Results of the models are presented in Table 6.

Taken together, these findings signify that for social enterprises with average characteristics (i.e., reflective of the counties found in this study) product innovation is the more likely outcome that other types of innovation, or no innovation at all. That said, the greater the government spending on public health and education, the lower the probability of social enterprise marketing innovations. This makes sense, as active public health initiatives are largely driven through marketing campaigns, thereby reducing the need for social enterprises to compensate (Table 7).

Discussion

The overall objective of this paper was twofold, contributing to both the NIS and social enterprise literature. First, this paper explored if the MISE variables identified by Kerlin (2009, 2013) to predict the size of social enterprise across countries, could similarly predict social enterprise innovation across countries. Secondly, the NIS literature has not given serious attention to social and/or non-technological innovation and its role in economic and/or social development. Thus, this paper extends the NIS literature by considering the role of social enterprise innovation within this context. These gaps are filled by empirically testing social enterprise innovation using advanced analytical techniques in multilevel modeling. And finally, S&T measures are predominantly used to measure country-level competitiveness. Relying on narrow definitions of innovation has been critiqued in the social enterprise literature as not fully capturing the impact of social enterprise and social innovation within a country. These results provide important empirical support that broader conceptions of how to define and measure the impact of social innovation at the country-level is necessary when evaluating country competitiveness and innovative potential.

This study lends quantitative empirical evidence to support the assumption that most social enterprises are innovative (69%). Furthermore, we find that of the innovative social enterprises, most innovations were in marketing (59%). This result, however, also challenges assumptions that social enterprises/social entrepreneurs have solutions to the world's most pressing problems,

Table 6 Opportunity variables predicting social enterprise innovation types

Source	Product		Process		Marketing	
	B	*OR*	*B*	*OR*	*B*	*OR*
Intercept	0.21	1.23	− 0.38*	0.69*	− 0.58*	0.56*
Human development (GMC)	1.03	2.80	0.64	1.90	− 1.82	0.16
Environmental opp. (GMC)	0.00	1.00	0.01	1.01	0.03	1.03
Commercial opp. (GMC)	0.00	1.00	0.00	1.00	0.00	1.00
Income inequality (GMC)	0.02	0.99	0.06	0.94	0.04	0.96
(log) Total population (GMC)	0.01	1.01	0.12	1.13	0.13	1.14

*$p < 0.05$

Table 7 Summary of results

Research questions and hypotheses	Outcome
Does accounting for macro-institutional factors help explain variation in the size of social enterprise innovation (SEI) across countries?	*Supported* Yes. Social enterprise innovation does cluster by country. 11.8% of variation in social enterprise innovation is accounted for by macro-institutional variables. More specifically, social enterprise process and marketing innovations cluster by country, but product innovations do not
Hypothesis 1: Similar to the MISE framework on the size of the social enterprise sector; social enterprise innovation varies by country	
Hypothesis 2: There will be more SE innovation in countries with particular macro-institutional characteristics: strong welfare state (public spending on education and health); strong governance system (effectiveness, regulation corruption, rule of law); low uncertainty avoidance and low collectivist values; high economic competitiveness	*Partially supported* There was a negative (−) relationship between marketing innovations and size of the welfare state in a country That is, increased spending on public health and education led to decreases in social enterprise marketing innovations
Hypothesis 3: There will be more social enterprise innovation in countries with high innovation capacity (STEM workforce, patents)	*Not supported* No significant relationship was found between national-level innovation capacity variables and social enterprise innovation
Hypothesis 4: There will be more social enterprise innovation in countries with a strong commercial market sector and more social and/or environmental opportunities	*Not supported* No significant relationship was found between national-level opportunity variables and social enterprise innovation

when in fact, they are mostly innovative when it comes to how they market themselves.

This study provides evidence for the use of multilevel modeling as opposed to basic logistic or ordinal logistic regression on the investigation of social enterprise innovation. Findings demonstrate that understanding the national context of social enterprises, in terms of country-level factors, tells a more comprehensive story of social enterprise innovation. Overall, evidence suggests that a failure to recognize the role of national context can potentially undercut the validity of results involving social enterprise innovation.

Conclusion

The findings demonstrate that social enterprise innovation is a viable theoretical construct that warrants further attention in the social enterprise and social innovation literatures. Moreover, social enterprise innovation as an extension of the social enterprise organizational form is worthy of further investigation, particularly with regard to differentiating between types of innovative activity (i.e., product, process and marketing innovations). However, using established indicators from the NIS framework to examine the impact of innovation capacity on social enterprise innovation demonstrates that existing S&T indicators (i.e., R&D investments and STEM workforce) are not useful predictors of social enterprise innovation. This is an important finding, particularly as the social enterprise sector continues to grow across all the world regions. This finding has implications for countries seeking to promote innovative organizations to address national social and/or environmental problems, in that countries should look beyond S&T indicators when encouraging innovation. Similarly, thinking on a global scale, datasets measuring country competitiveness and potential investors (i.e., INGOs, countries, individuals, or multinational organizations, such as the World Bank or IMF), should account for more than S&T indicators when evaluating country-level competitiveness or determining investment potential.

As with other global comparative studies, results are safely interpreted as cross-sectional and correlational, but fall short of causal determinations. Likewise, although multilevel modeling techniques provide a better understanding of nested data, the method alone cannot lead directly to causal links. The GEM data also have validity limitations. Attempts to mitigate this limitation in the analysis were done by restricting data to existing owner/manager/founders of businesses, as opposed to nascent entrepreneurs. Limitations also resulted from missing data for country-level variables of interest. For example, the civil society variable had to be dropped due to insufficient data). Similarly, data were collected at the organizational level on percent of income from commercial revenue, percent volunteer workers, organizational age and organizational size. Unfortunately, missing data on organizational attributes in the GEM survey restricted analysis of the attributes influencing innovation at an organizational-level.

The current state of the literature on social innovation, and social enterprise innovation, in particular, is anemic. Previous research have claimed that social enterprises are inherently innovative (Chell et al. 2010; Dees 1998; Light 2006), but the form of these innovations and what impact they may or may not have on their stakeholders has lacked theoretical and empirical support. Future research should

unpack the social innovation landscape to include and differentiate social enterprise innovation from the broader (and messier) social innovation literature.

Additional limitations of the study are methodological. Multilevel modeling is an appropriate technique to use when attributing relationships between nested variables. That said, future researchers may adopt additional techniques to further clarify and refine the findings of this study. For example, other papers have investigated the impact of macro variables on organizations' performances employing other techniques (i.e., OLS country dummy variables) to attest to the robustness of the results (Vanroose and D'Espallier 2013) and instrumental variables to attest the causality (Périlleux et al. 2016). While worthwhile, we chose in this article to limit additional tests of robustness and causality, and place our primary focus on the MISE framework and the evidence garnered to support its continued use and/or expansion with these preliminary insights.

Another limitation is that while it is well-established in the literature organizational attributes also influence social enterprise innovation (Chahine 2016; Dees 1998; Defourny and Nyssens 2010; Guo and Bielefeld 2014), the influence of organizational-level variables on social enterprise innovation was not included in this study. Although beyond the scope of the present work, future research may incorporate additional organizational-level (e.g., organizational age and size) and/or individual-level (entrepreneurial motivation) factors into cross-level interaction models combining both macro-, meso- and micro-level factors into a two or three-level multilevel model order to determine which of these attributes might also influence social enterprise innovation.

National policymakers, academics and members of the international development community view social enterprise as a potential solution to long-standing societal ailments. A government official may wish to incentivize social enterprise innovation; however, his/her expectations may be stunted due to particularities of the national context (i.e., effective governance may be positively associated with social enterprise innovation in countries where there are fewer social opportunities). Policy makers should strongly consider adopting a more pluralistic view of social enterprise, particularly when comparing social enterprises from different institutional contexts. Furthermore, as stated earlier, existing S&T indicators are not strong predictors of social enterprise innovation. As such, national investments in R&D and expanding the STEM workforce may not be the most appropriate next steps for policy makers interested in promoting innovative organizations aimed at resolving entrenched social and environmental challenges.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Appendix 1: 2009 GEM Countries

Middle East	Latin America and the Caribbean	Europe/North America	Asia	Africa	Oceania
Algeria[bc]	Argentina[b]	Belgium[c]	China[b]	Uganda[c]	Tonga
Iran[b]	Brazil	Bosnia and Herzegovina[bc]	Hong Kong[b]	South Africa	
Jordan[bc]	Chile[c]	Croatia[bc]	Japan		
Lebanon[bc]	Colombia	Denmark	Malaysia[b]		
Morocco	Dominican Republic[bc]	Finland	South Korea		
Saudi Arabia[bc]	Ecuador[b]	France			
Syria[bc]	Guatemala[b]	Germany			
Tunisia[bc]	Jamaica[bc]	Greece[b]			
United Arab Emirates[bc]	Panama[bc]	Hungary[b]			
West Bank and Gaza Strip[ac]	Peru[c]	Iceland[bc]			
Yemen[abc]	Uruguay[bc]	Ireland			
	Venezuela[bc]	Israel			
		Italy			
		Latvia[bc]			
		Netherlands			
		Norway[c]			
		Romania[c]			
		Russia			
		Serbia[bc]			
		Slovenia[b]			
		Spain			
		Switzerland			
		United Kingdom			
		United States			

Missing values for key variables: [a]Global Competitiveness Index; [b]Civil Society Models, [c]GLOBE Culture

Some countries had well over 2000 respondents: Belgium (n = 3989); Chile (n = 5000); Colombia (n = 3608); Germany (n = 6032); Iran (n = 3350); Italy (n = 3000); Netherlands (n = 3003); Slovenia (n = 3030); South Africa (n = 3135); Spain (n = 28,888); UK (n = 30,003); US (n = 5002). Countries with fewer than 2000 respondents include Japan (n = 1600), Morocco (n = 1500), Russia (n = 1695), Tonga (n = 1184) and Venezuela (n = 1693). Excluded from these numbers is Shenzhen, China which is a region not a country.

Appendix 2: Innovation

The definition of innovation used in this study is taken from the Oslo Manual: "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations" (Tanaka et al. 2005). There are three Oslo types of innovation captured in GEM: product, process and marketing. Five GEM variables were used to construct the innovation variable: *seontype, seonprod, seondelv, seonprmo, seonniche*.

- Product innovation (GEM variable: *seontype*)—a product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics.
- Process innovation (GEM variables: *seonprod* and *seondelv*)—a process innovation is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software.
- Marketing innovation (GEM variables: *seonprmo* and *seonniche*)—a marketing innovation is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing with the objective of increasing sales. New marketing methods in product promotion involve the use of development and introduction of a fundamentally new brand symbol (as distinguished from a regular update of the brand's appearance) which is intended to position the firm's product on a new market or give the product a new image.

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