

ENTREPRENEURSHIP CHANNELS AND SUSTAINABLE DEVELOPMENT: DIRECTIONS FOR THE ASIAN ECONOMY

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Abstract. Entrepreneurship has been identified as a catalyst for creating opportunities and enhancing productivity. The Asian economy is one of the fastest growing economies and entrepreneurially inclined continents of the world, owing to the phenomenal strides of China's economic activities. Despite these, the region is still characterized as developing in terms equality, real income growth and welfare distributions. Thus, one wonders the extent the entrepreneurial strides impact on the continent; and, to what extent are the socio-economic structures of the Asian economy relevant for achieving sustainable entrepreneurship development. Thus, by employing the Generalized Method of Moments (GMM), this study assesses the extent to which the current wave of entrepreneurship outcomes can actualize the Global Development Goals slated for 2030. The findings show that improvement in life expectancy and decrease in inequality influenced entrepreneurial outcomes via the basic requirement channel; while higher education which is an efficiency enhancing channel stimulates income than innovations; thus, indicating the need for continuous investments for nascent training; while investments in research and development is an institutional channel that promotes entrepreneurial outcomes. Thus, if the global goals will be actualized, policy makers should strengthen infrastructures and create enabling environments that will improve entrepreneurial outcomes within Asian economies.

Keywords: entrepreneurship channels, sustainability, efficiency, institutions, generalized moments of method, innovation, economic growth.

JEL Classification: M2, O1, O4.

Introduction

In a dynamic and ever-changing world, entrepreneurs remain a standing catalyst for creating opportunities and enhancing productivity (Lucas & Fuller, 2017). This owes to the allusions that entrepreneurship spurs innovative functions. Hence, the motivation for this study

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stems from a number of dimensions. First, it is interesting to note that *entrepreneurship* has become a phenomenon that is required for virtually every facet of human endeavours. This is because the concept has gone beyond just the traditional explanations of management or factor organization to underscore creativity, innovations, inventions and even frugality (Rao, 2013; Tiwari & Bergman, 2018). Moreover, entrepreneurs can be categorized as either being positively influential that is being constructive, disruptive or productive; or being unproductive and even destructive. While the former addresses issues of new market creation and value network; the latter addresses rent-seeking activities and issues of when resources are expended to capture rents or appropriate wealth (Lucas & Fuller, 2017).

Already, studies have equally shown that beyond the traditional economic approach to development, if developing economies are going to evolve differently as regards development, investment in entrepreneurship has been spotted as one step in the right direction (Baumol et al., 2009; McCloskey, 2010; Ahlstrom, 2010); therefore, policies in this direction has become an inevitable channel for exploration. For instance, Bruton et al. (2015) noted that beyond capital accumulation, infrastructure financing and human capital development which are traditional explanations for economic growth and poverty reduction, new venture creation, entrepreneurship and entrepreneurship supportive institutions have become the nascent direction for post-modernization era. Some other studies have equally affirmed that entrepreneurship can only make relevant expected impact when the right institutions are present (Lee & Kim, 2019; Ren & Jackson, 2020; Prabhugaonkar et al., 2020). Meanwhile, Baumol et al. (2009) noted and Bruton et al. (2015) reiterated, the workings for entrepreneurship sustainability as a function of institutional structures. Also, Sobel (2008) provided evidence that higher venture capital investments per capita, a higher rate of patents per capita, a faster rate of sole proprietorship growth, and a higher firm establishment rate were facilitated via better institutional structures; while, economies with poor institutions recorded high activities in unproductive entrepreneurship to include lobbying, abuse of law suits, and the likes. Dilli, Elert, and Hermann (2018) distinguished between formal institutions (tax laws, patents, employment laws, trade policies, competition policies, contract laws and market regulations) and informal institutions (trust, social capital, power distance and) institutions that are relevant for entrepreneurship development; as well as flexible institutional environments (for finances, labour, legal systems). These institutions are typical of the structures in western countries that facilitate Schumpeterian forms of entrepreneurship compared to the constrained and regulated systems that hampers inter-entrepreneurial activities which was typical of operated in most European and even developing economies (Dilli et al., 2018).

The Asian economy has been characterized as one of the fastest growing economy; and even entrepreneurially inclined continents of the world (Kohli, 2004; Spence, 2011). This owes to the presence of the activities of the Asian tigers (Singapore, Hong Kong, South Korea and Thailand); as well as the phenomenal strides in East Asia and particularly China in terms of international trade, finance, productivity, firm output, innovations and inventions (Bosma & Kelley, 2019). Meanwhile, from the 2019 report of the Global Entrepreneurship Monitor (GEM), of the 49 economies covered, 6 countries have equal rates of starting a business between men and women. These economies include two in the

East and South Asia region (Indonesia and Thailand), one in Latin America (Panama) and three in the Middle East and Africa region (Qatar, Madagascar and Angola) (Bosma & Kelley, 2019). But the actualization of this GEM postulates notes that it is all contingent on working structures and institutions available within an economy. Therefore, another bothering issues in this regard is to what extent are supportive entrepreneurial structures reflected across the Asian economies and how relevant are they for the Asian continent as a whole? Also, one may want to wonder how sustainable are these entrepreneurial strides for the Asian economy? In addition, to what extent are the socio-economic structures of Asian economy relevant for achieving sustainable entrepreneurship development? Thus, this study builds on the thoughts of Kirzner (1973) and Baumol (1996) who exemplified that for an economy to truly attain sustainability as far as entrepreneurial strides are concerned, such economy must have an institutional framework that is consistent with fostering productivity and ingenuity. However, the interest of this study is not about just being entrepreneurial, but the channels to attaining and sustaining this feat.

Bruton et al. (2015) noted that more than 1.7 billion persons in Asia wallow in poverty and live below the \$2 per day bench mark; and argued that beyond the subsistence entrepreneurship – which is tilted towards actualizing basic needs- a more sustainable approach tagged “substantial entrepreneurship” – which involves creating institutions for new ventures, property rights and growth opportunities – should be embraced as it appears a more formidable direction for the Asian economy. Meanwhile, the sustainability of entrepreneurship development in the Asian continent is contingent on several factors which ranges from social to cultural, institutional, environmental, economic and political issues (Sengupta & Sahay, 2017; Rekarti et al., 2019). In other words, the extent of innovation and investment risk depends on several interactive structures at both private and public organizations as well as management levels. For instance, it is understood that the extent to which private entrepreneurship will thrive is heavily contingent on not just public policies but on public entrepreneurship (Klein et al., 2010). Therefore, permeating every facet, entrepreneurship has not been limited to the private domain alone which explains how entrepreneurship has evolved dynamic categories to include political entrepreneurship, social entrepreneurship, sustainable entrepreneurship, legal entrepreneurship. Therefore, this study contributes to unbundling the intricacies or the networks that must be navigated to attain the expected entrepreneurial development within the Asian economy. This is with a view to strengthening policy directions that will ensure phenomenal socio-economic structures not only to complement entrepreneurial activities but to also actualize sustainability in business and economic activities. This will not just enhance the development quest in developing economies, rather, it will also preserve physical, human and material investments made within these economies.

To illustrate these objectives, the rest of the article is structured as follows: Section 1 gives an overview on different institutional structures relevant for achieving sustainable development; Section 2 discusses the channels considered for sustainable entrepreneurship development; Section 3 presents the method and data used; while Section 4 presents and discusses the findings, last section concludes the study and states the limitations of the study.

1. Literature review

1.1. Entrepreneurship channels, outcomes and sustainable development

Entrepreneurship channel is conceived as an avenue or pathways undertaken to boost entrepreneurial outcomes. According to Sobel (2008), entrepreneurship channels involves the certain processes, structures or frameworks such as institutions that can be utilized to boost productivity among entrepreneurs. In a micro analytical policy framework, Audretsch, Grilo, and Thurik (2007) identified 7 channels that applies to entrepreneurship relevant for boosting entrepreneurial outcomes. These channels include technology development, demand shifts and resource availability; demographics and culture; ability resources; risk attitude; entrepreneurial options; business opportunities, entrepreneurial discrepancies. Several other channels have been identified for boosting entrepreneurship outcomes. For instance, in addition to Institutions, Wiseman and Young (2013) noted that economic freedom is a viable channel for improving entrepreneurial activity; while Mathew (2010) and Kargwell (2012) identified Information and Communications Technologies (ICTs) and social media and networks as a mechanism in globalization entrepreneurs are catching on to improve entrepreneurial outcomes. Some of the other channels that have been utilized for analytical purposes are further discussed in the next section.

Entrepreneurship outcomes are categorized as the fallouts of engaging direct and indirect entrepreneurial inputs. At the micro level, these outcomes of entrepreneurship could include dividends such as productivity growth, profits, and reinvestments for greater outputs; while on the macro scale, entrepreneurial outcomes can be measured in net national income, gross national income, gross fixed capital formation and income per capita. The long-run influences of entrepreneurship outcomes are therefore are expected to shape sustainable development.

Sustainable development on the other hand has been basically tailored along the 1987 Brundtland definition as a form of development that caters for the need of the present without compromising the ability of the future generation to meet their own needs (Armstrong, 2002; Constantinescu & Platon, 2014). Daly (1990) distinguished between sustainable development and sustainable growth. While growth is quantitative increase in physical measure, while development is qualitative improvement or unfolding of potentialities. However, Daly emphasized sustainable development as a qualitative development of non-owing systems that has been observed for long periods of time. Specifically following the report of the Brundtland Commission Report (World Commission on Environment and Development, 1987), sustainable development involves a process where harvest or activity rates should equal regeneration rates (sustained yield) as well as where waste emission or pollution rates should equal the natural assimilative capacities of the ecosystems into which the wastes are emitted especially via economic activities (Daly, 1990).

Therefore, to actualize sustainable development, income earned overtime should feedback into the natural systems to promote sustainable through redistribution into natural, physical and human systems (Dean & McMullen, 2007; Rodgers, 2010). Emas (2015) noted given the perspective goal of sustainable development (SD) on actualizing long-term stability of the economy and environment, it is pertinent to recognize and integrate economic, environmental, and social concerns throughout the decision-making process. In other words, a continu-

ous interrelationship is expected to occur between economic decision units such as entrepreneurs and economic activities if long-run development will be actualized and preserved.

1.2. Institutional structures and entrepreneurship sustainability: an overview

Institutional structures required for entrepreneurial sustainability range from globalization structures and government infrastructural set-ups to lending institutions and even household arrangements. Bruton et al. (2015) argued in the direction of strengthening institutions which include property rights, microlending and informalities. Although, Im and Sun (2015) argued that micro lending through finance institutions are profit-driven, and as a result may strain the expected returns for utilizing them as institutions for entrepreneurship development. As a result, Im and Sun (2015) suggested that microlending should operate within the social tenets and state-level institutions, where moderate profit motive of lending institutions will have more wholistic and inclusive impacts on the people and intentions to enterprise. Alvarez et al. (2015) in addition to microfinance listed some structures working in consonance with social entrepreneurship to reduce poverty. These structures include foreign aid, base of the pyramid initiatives, and a functional property rights system. In a similar sphere, Si et al. (2015) by drawing inferences from Yiwu in China, noted behavioral and attitudinal approach as a stimulant for income growth and entrepreneurial opportunities.

Meanwhile, George et al. (2015) using the indian economy noted that through opportunity framing, entrenchment, and propagation, institutional entrepreneurship will actualize the workings of an organization. Furthermore, George et al. (2015) highlighted innovation as instrumental in organizational strategies and administration which will have spillover effects on the network of the government, private healthcare providers, and the population as a whole. In order to lend support to the workings of institutions for entrepreneurial development, Autio and Fu (2015) found evidence to support that economic and political institutions to a large extent evolve the occurrence rate of formal entrepreneurial systems as against informal structures. Autio and Fu (2015) noted that institutional quality will not only double the rates of formal entrepreneurship, it will also reduce the rate of informal entrepreneurship by half; as well as complement the workings of the formal and informal structures for improved productivity.

In addition to the foregoing, the administration of public resources by the government have become an increasingly contingent channel for entrepreneurship development. According to Sobel (2008) and Klein et al. (2005), public sector is designed for public agents to manage economic resources which are communal or jointly owned by community members for optimal benefits of the community. This follows the thoughts on *public entrepreneurship* which involves creating new arrangements or structures for the creation, control, allocation, disbursement and utilization of public resources. Specifically, according to Klein et al. (2005), entrepreneurial strides or innovations via the public structures could be made evident though several means to include the establishment of new public organizations, new institutional environment, innovative dimensions or approaches to the management of public resources, as well as the utilization of outcomes from the private sector for the wider good. Meanwhile, according to Ostrom (1990, 2005), in the pursuant of social objectives, political actors also

combine private resources with public resources to achieve the goal of economic efficiency. Klein et al. (2005) analysed North's (1990) idea of countries minimizing transaction cost through mechanisms that can engineer optimal returns via governance structure.

Meanwhile, in the arguments of Baumol (1996), he opined that the quantum of economic activities is stable, but the real issue centers around the allocation of resources that will stimulate and sustain entrepreneurship, which varies across countries. Baumol also noted that institutions – which he referred to “set of rules” – guided entrepreneurial variations across countries, but economic planning will cripple entrepreneurial vibrancy. Incidentally, the thoughts of Baumol is consistent with Kirzner (1973); who attributed entrepreneurial vibrancy to effective public policies- where market prices are right, rule of law is working and property rights are well defined. Therefore, Kirzner opines that when institutional structures are working appropriately, the prospects for entrepreneurship sustainability are not just ascertained, also the welfare of the people are better off. Meanwhile, Lucas and Fuller (2017) argued that institutions could also coerce the opportunities that are available to an individual. Therefore, having synthesized the workings of institution by the selected macro-economic indicators, the focus of this study is to examine the extent institutional structures have brought about entrepreneurial development in the selected region. This is with a view to articulating clear-cut policy course for entrepreneurial substantiality in the Asian region which includes the Middle East.

Apart from these intuitional structures, the mode of operation is another issue for sustainability. Dilli, Elert, and Herman (2018) in the assessment of the institutional foundations of entrepreneurship noted that less flexible institutions (finance-related, labour-market, education and training and inter-firm institutions governing entrepreneurship) in European and developing economies hamper inter-firm collaborations. Following the tenets of “Varieties-of-Capitalism”, it was observed that entrepreneurship-relevant institutions fostered complementarities among selected firms especially when they are flexible. Also, Dilli et al. (2018) observed that Anglo-Saxon economies (Ireland, the UK, and the US) operated through permissive financial and deregulated labour markets, scientific education systems teaching workforces general skills, and reliable legal systems governing inter-firm collaborations. While Continental and Northern European economies exhibited permissive financial and well-regulated labour markets, vocational education systems that teach specific skills to workforces, and reliable legal systems supporting inter-firm collaborations; France, Italy, Portugal, and Spain had constraining financial institutions and constraining labour markets, education systems that mostly teach basic skills to workforces, and unreliable legal systems that make interfirm collaborations difficult. Also, countries like Poland, Slovenia, Slovakia and Czech Republic, exhibit constraining financial and regulated labour markets, education systems that mostly teach basic skills, and unreliable legal systems that hamper inter-firm collaborations. In a similar context, Jessop (2019) observed some of the limits of urban entrepreneurial strategies in Asia to include educational, religious and support structures that are reflected through social exclusion and constrained competition.

In all, for social, economic and political institutional structures to deliver on actualizing entrepreneurship sustainability, improved credit access, good governance, flexible systems and well targeted and relevant development investments and infrastructures are to be considered.

2. Conceptual framework

Channels considered for sustainable entrepreneurship development

As noted from these reviews, there are myriads of institutional and support structures that are required for improving and sustaining entrepreneurial outcomes. However, this study hinges on the identified structures of Kelley et al. (2011) to assess the channels for entrepreneurial sustainability in Asia.

Utilizing a macroeconomic analytical approach, the channels identified for entrepreneurial sustainability here are aggregated variables from organizations in the selected economies. This is in consonance with the proposition of Baumol (1996) who identified economic structures or institutions as a necessary or preconditions for entrepreneurship success and sustainability. According to Kelley et al. (2011), the GEM report identified channels can be categorized into micro and macro categories for entrepreneurial development and sustainability. While the micro channels include the conception phase, early phase and the consolidation phase; the macro channels, as shown in Figure 1, follow a three-set framework or basis conditional for entrepreneurship development to include *basic requirements* – these include basic needs as basic institutions and infrastructure, health and primary education; *efficiency enhancers* such as higher education, efficiency of labour market, technological know-how and financial markets; and *innovation and institutions* which cover issues like public policies, support institutions like financial access, research and development, technology diffusion, entrepreneurship education, training and development programs and physical infrastructure (Kelley et al., 2011). These identified framework gives an insight into the required channels required for sustainable entrepreneurship through various socio-economic platform and even development.

This framework sets a pace for entrepreneurship activity and in turn impact the growth and development of economies. The components embedded in basic requirements and efficiency enhancers can be referred to as establishments required for markets to function properly; while the workings of innovation and entrepreneurship are essential for growth and

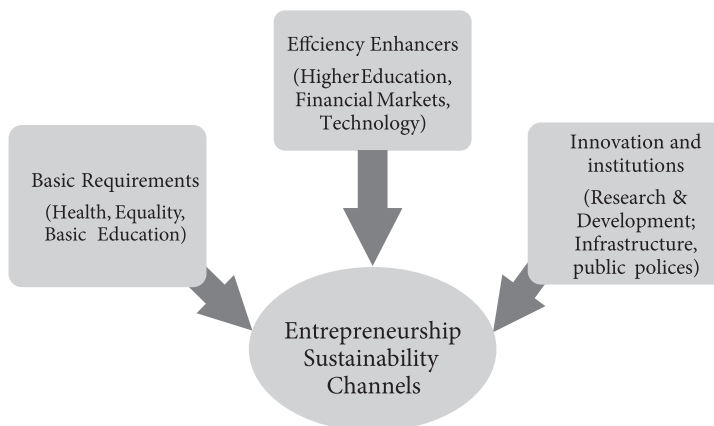


Figure 1. Entrepreneurship sustainability channels (source: adapted from Kelley et al., 2011)

innovation. Based on these identified channels, via a panel cross-country analysis, this study assesses the workings of each channel. This is with a view to identifying areas for improvements and consolidation in entrepreneurship development; as well as informing policies on viable structures for actualizing entrepreneurship sustainability in developing economies.

3. Data, empirical model and method

Data

The data for this study includes 46 countries in the Asian region (see Appendix); and our analysis relies on data within the period 1990–2017. The sample countries include those countries for which data on the considered organizational and institutional variables which is of primary interest to the study are concerned. The main data source for the variables are World Bank World Development Indicators (2018); International financial statistic (International Monetary Fund, 2018); International Country Risk Guide Dataset (2018); and Standard World Income Inequality Dataset (Solt, 2019). Meanwhile, A summary of the indicators employed for the study are presented in Table 1.

Table 1. Selected analytical variables (source: author's selection)

Variables	Proxy Variable	Expected Outcome
Outcome Variables		
National Income	Gross National Income (GNI)	–
National Output	Gross Fixed Capital Formation (GDP) (<i>for robustness/verification checks</i>)	–
Explanatory Variables		
Basic Requirement Channel		
Health	Life Expectancy (LHH)	Positive
Level of Equality	Gini Coefficient (EQTY)	Negative
Education	School Enrolment (EDC)	Positive
Efficiency Enhancers		
Education	School Enrolment (EDC)	Positive
Financial Markets	Domestic Credit to the Private Sector (FNC)	Positive
Technology	Information and Communications Technology (ICT) Growth Rate	Positive
Innovation and Institution		
Research and Development	Investment in Research and Development (R&D)	Positive
Infrastructure	Net official development Assistance (IFC)	Positive
Public Policy	Democracy Index (PPC)	
Control Variables		
Economic Openness	Trade Openness (TRO)	Positive
Foreign Investments	Foreign Direct Investment (FDI)	Positive
Population Growth	Rate of Population Growth (PPG)	Positive

From the purpose of analysis and inferences, while some of the variables have been transformed into their logarithmic form (health, school enrolment, finance, gross national product and gross domestic product), some other variables have been left in their current form. Since they are in form of rates (technology, Gini index, economic openness, population growth, rate of FDI inflow, democracy, research and development).

From Table 2, the average natural growth rate of gross national income (GNI) in the Asian region is 7 percent. While the average school enrolment rate is 6% and the average life expectancy (LHH) which is 69.2 is growing at the rate of 1.8 percent. The average rate of inequality as shown by the Gini coefficient is 39 percent which indicates a high level of inequality is still prevalent in that region. In addition, while the average population growth is about 6 percent, the degree of openness is seen to be high with an average of 88%. Also, the average rate of FDI inflows and domestic flows to the private sector into the region is about 4.9 and 1.6 percent; indicating a higher presence of foreign inflows outmatching domestic flows.

Table 2. Descriptive Statistics of the Selected Variables (source: author's computation using E-views 9.0 (IHS Global Inc., 2015))

Measures	Mean	Median	Maximum	Minimum	Std. Dev.	Sum
GNI	7.06726	9.72636	13.0301	-1.98436	4.91701	2275.66
LHH	1.85346	1.85977	1.92081	1.727566	0.03511	596.813
EDC	6.24572	6.23758	8.14598	4.648233	0.92684	2011.12
FNC	1.65831	1.69877	2.40357	0.519005	0.41351	533.976
R&D	2.98E+09	0.97747	1.87E+11	-1.11E+10	1.56E+10	9.59E+11
EQTY	39.7595	43.75	52.3	0	12.497	12802.6
ICT	6.23065	8.32587	11.0353	0.148102	3.89316	2006.27
PPC	5.74087	4	55	0	8.56229	1848.56
GDP	13.5303	5.66219	310.925	-29.3	38.4003	4356.76
FDI	4.9851	2.98648	198.075	-43.4626	13.1899	1605.2
INF	5.5E+07	3.1651	2.69E+09	-3.13E+08	2.52E+08	1.76E+10
TRO	88.7818	74.5877	422.648	16.67948	61.5438	28587.7
PPG	6.6E+07	6629850	1.21E+09	-0.18523	1.97E+08	2.12E+10

Before presenting the findings, it is pertinent to conduct a validity and reliability check on the proposed dataset through the use of stationarity test. The stationarity test performed used the method proposed by Levin et al. (2002) and further verified by Augmented Dickey-Fuller and Philip-Perron tests (Maddala & Wu, 1999; Hadri, 2000; Wooldridge, 2016; Furuoka, 2014). For analytical purposes and the GMM estimation technique to be employed, it is expected that all the variables to be employed are integrated of order 1 (I(1)) as against and order of 0 (I(0)). The stationarity test performed is presented in Table 3. All the variables indicated to be used for analysis are stationary at I(1) and are therefore relevant for analytical purposes.

Table 3. Result of Unit root test (source: author's computation using E-views 9.0)

Variables	LLC	ADF-Fisher	PP-Fisher
GNI	8.519*	8.664*	12.467*
Δ GNI	-6.154*	30.475*	58.388*
GDP	3.950*	58.853*	30.388*
Δ GDP	-9.049*	42.384*	95.403*
GCFC	-7.478*	83.465*	40.904*
Δ GCFC	-13.915*	57.997*	25.179*
LHH	-13.143*	33.599*	56.004*
Δ LHH	-18.018*	53.884*	84.241*
EQTY	-5.515	12.068*	13.004*
Δ EQTY	-8.047	36.518*	20.430*
EDC	0.422	74.362*	94.253*
Δ EDC	-3.253*	36.518*	58.115*
FINANCE	3.907*	52.460*	35.373*
Δ FINANCE	-7.632*	67.102*	43.072*
ICT	4.112*	78.035*	21.255*
Δ ICT	-10.119*	36.721*	70.702*
INFRAST	-14.097*	47.240*	24.267*
Δ INFRAST	-9.481*	68.972*	92.942*
DEMOCRAT	-18.724*	18.294*	30.543*
Δ DEMOCRAT	-5.274*	46.512*	18.133*
OPEN	-2.254	98.836*	46.359*
Δ OPEN	-11.327*	68.511*	62.846*
FDI	-2.625	53.948*	21.358*
Δ FDI	-17.459*	46.578*	79.866*
POP	-2.653	21.001*	88.458*
Δ POP	-4.750*	59.524*	92.638*

Notes: * represents variables that are stationary at 5% level of significance. Δ first difference operator. LLC represents Levin et al. (2002), ADF denotes as Augmented Dickey Fuller and Phillip Perron Fisher unit root tests respectively. Panel unit root tests comprise intercept and trend.

The model specification of the analysis within this study follows the thoughts of the channels identified within the conceptual framework presented in the preceding section as specified by Figure 1; and they are presented in turns.

Entrepreneurship Sustainability through Basic Requirements Channel: According to literature, unlike other regions of the world, the presence of fossils in form of oil and natural gas reserve in the in the gulf region of the Middle East has led to an increase in economic development. Interestingly, this development has some spillovers for entrepreneurial develop-

ment and economic growth in other regions like the Asian economy; as well as other sectors of the economy (Gause, 2000). These spillovers for entrepreneurial development have been identified in policies that shape variables like health status (LHH), level of equality (male-female participation/freedom) (EQTY) and basic educational investments (EDC). Thus, following these variables and the controls, Eqs (1a) and (1b) is specified as:

$$GNI = f(LHH, EQTY, EDC); \quad (1a)$$

$$GNI = f(LHH, EQTY, EDC, FDI, PPG, TRO). \quad (1b)$$

Entrepreneurship Sustainability through Efficiency Enhancers Channel: According to Kelley et al. (2011), some of the efficiency enhancers contingent for entrepreneurial sustainability include higher education (EDC), financial market development (FNC) and technological growth (ICT). For instance, Mathew (2010) and Hyuk and Park (2019) opined that the combination of entrepreneurship and the use of information and communication technology (ICT) will mitigate some of the challenges of business start-ups and even sustainability; and the same applies to education and financial sector development as noted by Kelley et al. (2016) and Im and Sun (2015). Meanwhile, the rate of globalization and the need to continually evolve in a dynamic world is increasingly putting pressure on entrepreneurs and the private sector alike in Asia. Therefore, utilizing the selected indices and introducing the control variables, Eqs (2a) and (2b) informs the extent to which the existing efficiency enhancers have driven entrepreneurial activities in the region.

$$GNI = f(EDC, FNC, ICT); \quad (2a)$$

$$GNI = f(EDC, FNC, ICT, FDI, PPG, TRO). \quad (2b)$$

Entrepreneurship Sustainability through Innovation and Institutional Channel: Klein et al. (2010) noted that countries can achieve optimality by being entrepreneurial which involves acting entrepreneurially by realigning property rights and creating new governance mechanisms. Thus, examining some government policies and investments, the effects of current arrangements for entrepreneurship development are assessed within the region in question using the variables Research and Development (R&D), Infrastructure (IFC), and Public Policies (PPC).

$$GNI = f(R \& D, IFC, PPC); \quad (3a)$$

$$GNI = f(R \& D, IFC, PPC, FDI, PPG, TRO). \quad (3b)$$

The specified equations will be analyzed via the GMM analysis. The technique of analysis considers a dynamic panel data model for analyzing the effect of institutional structures on entrepreneurial outcomes within the macroeconomic framework of attaining sustainability in the Asia. With the exception of the lagged outcome which explain the short-run effects of the explanatory variables, the estimates generated are stated in long-run. This is to enable relevant inferences to be drawn for sustainable development.

The functional relationship of the variables is specified in Eq. (4) as:

$$\begin{aligned} \text{Entrepreneurship_Outcomes}_{it} = & \alpha + \sigma \text{Institutional_structures}_{it} + \delta X_{it} + \\ & \beta \text{Entrepreneurship_Outcomes}_{i,t-1} + \eta_i + \kappa_t + \varepsilon_{it}, \end{aligned} \quad (4)$$

where: i – country identifier; t – time period; *Entrepreneurship_Outcomes* – Gross National Income (GNI) *Entrepreneurship_Outcomes* _{$i,t-1$} – Lagged value of the Entrepreneurship outcomes-which explains the persistence of entrepreneurial outcomes; *Institutional_Structure* _{it} – denotes the extent of the effects of institutional structures identified to include basic requirements, efficiency enhancers and public institutions; X – The vector of control variables which are FDI, population growth (PPG); and economic openness (TRO); η_i – the country specific fixed-effects that caters for the influence of any unobservable factors on entrepreneurship outcomes and which are time-invariant; κ_t – The fixed effects that account time variant shared shocks; ε_{it} – The disturbance term.

The hypothesis is specified as a significantly positive coefficient for ' σ ' with the exception of the inequality index (EQTY) which is measured by the Gini coefficient and is expected to be negative vis-à-vis the outcome variable. To ensure that the estimations are consistent, different econometric techniques are applied on the data. First, we employed the pooled Ordinary Least Squares (OLS) which explains a strict relationship between the outcome and explanatory variables. Secondly, after performing the Hausman's test, the fixed effect (FE) estimate is adopted since it accounts for time variant properties and shocks (Arellano & Bond, 1991).

Meanwhile, in order to address the issues of endogeneity among the selected variables (that is feedback or reverse causality effects) for the region in focus; where there some of the selected explanatory variables may correlate with some of the components of ε_{it} – at meso and macro levels – not specified within the model, which indeed may be relevant for the entrepreneurship development. Examples of such factors could include gender, attitudes, experience, human capital). Another dimension to endogeneity is when the response variable, for instance income or income per capita has a reverse effect in dictating the pace of institutional set-ups (Epifanova et al., 2015), educational attainment (Proctor et al., 2016) and so on. Therefore, one way to address this challenge of endogeneity is to use the instrumental variable specification (Blundell & Bond, 2000). While the selected instrument should display variation over time and conform with fixed-effect specification (Bandyopadhyay et al., 2014); the instrument should be uncorrelated with the error term, then it must be correlated with the instrumented variable. Previous studies have shown that the Generalized Method of Moment (GMM) estimation technique is a suitable technique to handle the challenge of endogeneity (Blundell & Bond, 1998); which is seen in some previous studies that have adopted panel analysis in addressing macro-economic issues in developing countries (Bandyopadhyay et al., 2014; Efobi et al., 2018).

4. Results and discussion

Table 4. Entrepreneurship channels and entrepreneurship outcomes (source: authors' computation)

Panel A: Entrepreneurship Outcome through Basic Requirement			
Outcome Variable: GNI			
Explanatory Variables	Pooled OLS	FE	GMM
GNI_{t-1}			0.268(0.007)***
LHH	-30.608(3.801)***	10.999(0.673)***	12.197(0.418)***
EQTY	-0.046(0.011)***	-0.003(0.005)***	-0.004(0.001)***
EDC	-0.623(0.136)***	0.054(0.154)	-0.910(0.026)***
FDI	7.52E-07(0.000)	0.001(0.001)	-0.004(0.001)***
PPG	4.02E-09(0.000)	-1.02E-10(3.78E-10)	-6.12E-10(1.3E-09)
TRO	4.09E-08(0.00)***	-1.92E-08(1.65E-08)	-3.25E-08 (1.30E-09)***
C	69.940(6.986)***	16.944(0.005)	
Diagnostics			
R-squared	0.61		
F-statistics	24.567**		
Hausman-Test		12.544	
J-statistics			33.374
AR(2)			0.699
Panel B: Entrepreneurship Outcome through Efficiency Enhancers			
Outcome Variable: GNI			
Explanatory Variables	Pooled OLS	FE	GMM
GNI_{t-1}			0.221(0.001)***
EDC	-0.647(0.211)***	-0.054(0.187)	0.098(0.006)***
FNC	-3.387(0.402)**	-0.462(0.055)***	0.319(0.001)***
ICT	-0.031(0.047)	0.288(0.032)***	-0.127(0.000)***
FDI	2.77E-09(1.661)	7.06E-10(1.38E-10)***	2.94E-10(07.12E-11)***
PPG	5.35E-09(1.22E-09)	-5.52E-11(7.52E-10)	-2.17E-08(7.50E-11)***
TRO	7.76E-08(2.52E-07)***	3.30E-08(1.65E-08)***	1.36E-08(3.94E10)***
C	69.940(6.896)***	5.815(1.146)***	
Diagnostics			
R-squared	0.62		
F-statistics	19.824**		
Hausman-Test		10.439*	
J-statistics			26.131
AR(2)			0.997

End of Table 4

Panel C: Entrepreneurship Outcome through Innovations and Institutions			
Outcome Variable: GNI			
Explanatory Variables	Pooled OLS	FE	GMM
GNI_{t-1}			0.179(0.012) ***
R&D	-6.98E-11(1.35E-11)***	-7.25E-11(1.37E-11)***	3.49E-12(2.01E-13)***
IFC	-5.30E-09(8.43E-10)***	-6.13E-09(8.94E-09)***	3.8E-10(0.176)
PPC	0.014(0.032)	0.05(0.220)	-0.002(0.001)
FDI	7.41E-10(1.38E-10)	-7.07E-09(4.29E-09)	2.94E-10(7.12E-11)
PPG	-0.016(0.003)***	2.83E-09(1.04E-09)***	1.74E-08(1.36E-09)***
TRO	-3.30E-08(1.65E-08)***	-0.017(9.445)***	9.41E-04(0.001)***
C	9.339(0.354)***	9.445(0.359)***	
Diagnostics			
R-squared	0.64		
F-statistics	20.419**		
Hausman-Test		12.017****	
J-statistics			24.972
AR(2)			0.999

Note: The standard errors are the values in parentheses; while the superscripts are ***0.01, **0.05, and *0.10.

The assessment of the basic needs channel revealed as expected for some indices as presented in panel A of Table 4. For instance, the lagged values of entrepreneurial outcomes ($\beta = 0.268$, $P < 0.05$) – it is such that the past values of GNI had significant positive impacts on the current growth of national income which is used to measure entrepreneurial outcomes. Also, life expectancy and equality index conformed with apriori expectations. The findings on basic requirements channel to a large extent is consistent with the findings of George et al. (2015) and Lee and Kim (2019). Apart from the OLS estimate, it is seen that an increase in life expectancy had significant impacts on entrepreneurial outcomes ($\sigma = 12.197$, $P < 0.05$); the same applied to the income equality as measured by the Gini coefficient. It is such that an increase in inequality leads to a significant decrease in entrepreneurial outcomes, which also implies that a decrease in inequality leads to an increase in entrepreneurial outcome ($\sigma = -0.004$, $P < 0.05$). Meanwhile, both the pooled OLS and the GMM estimate recorded negative estimates of education on entrepreneurial outcomes ($\sigma = 0.623$, $P < 0.05$; $\sigma = 0.910$, $P < 0.05$); although the fixed effect estimates was positive, however, the positive effects were insignificants ($\sigma = 0.054$, $P > 0.05$). Therefore, the effects of basic education on entrepreneurial outcomes for the Asian region here is inconclusive. Similarly, from the result of the analysis, it is worthy of note that from Table 4 which is the model for basic requirements-entrepreneurial outcome nexus, the FDI, population growth

and trade openness had mixed effects on entrepreneurial outcomes; thus, rendering it inconclusive¹; however, as we move further in the analysis, the channel of influence via the controls – FDI, Population growth and openness becomes increasingly clear.

From panel B of Table 4, which concentrates on efficiency enhancing variables for improving entrepreneurial outcomes, the lagged value of the outcome variable (GNI) is equally a positive determinant of the current performance of entrepreneurial outcome in Asia. And, unlike the basic requirement channel, the GMM estimate revealed that higher education had positive significant effects on the entrepreneurial outcome ($\sigma = 0.098$, $P < 0.05$). Meanwhile, apart from the pooled OLS estimate, the FNC and ICT, had significant positive effects on entrepreneurial outcomes in Asia via the FE estimates ($\sigma = 0.462$, $P < 0.05$; $\sigma = 0.288$, $P < 0.05$) and GMM estimate ($\sigma = 0.319$, $P < 0.05$; $\sigma = 0.127$, $P < 0.05$). The implication of this is that higher education has more prospects for stimulating entrepreneurial development in Asia; while domestic credits and ICT are indeed efficiency enhancers for promoting entrepreneurial outcome in the region as well. Still on Table 4, while openness had a significant mixed effects on GNI, population growth had a significant negative effect on entrepreneurship outcomes in Asia given the FE ($\sigma = -5.52E - 11$, $P < 0.05$) and GMM ($\sigma = -2.17E - 08$, $P < 0.05$) estimates; and the FDI revealed significant positive effects for FE ($\sigma = 7.06E - 10$, $P < 0.05$) and GMM ($\sigma = 2.94E - 10$, $P < 0.05$). The implication of this is that while population growth remains a challenge to entrepreneurial outcomes in Asia, FDI and economic openness have had significant positive effects in stimulating entrepreneurial outcomes via national income growth.

Turning to panel C of Table 4, which is on entrepreneurial outcomes being sustained through innovations and institutions, it can be seen that while negative estimates were recorded for pooled OLS and FE for R&D and IFC, the GMM estimate which has been corrected for endogeneity showed that R&D ($\sigma = 3.49E - 12$, $P < 0.05$) and IFC ($\sigma = 3.8E - 11$, $P > 0.05$) had positive impacts on entrepreneurship outcomes in Asia- although R&D had significant impacts, IFC did not. Meanwhile, the GMM for the PPC revealed otherwise though insignificant ($\sigma = -0.002$, $P > 0.05$). The implication of this is that while R&D had significant positive impacts in stimulating entrepreneurial outcomes as far as income growth is concerned, Infrastructural development has insignificant impact on entrepreneurial outcomes; also, public policies can be seen not to sufficiently stimulate entrepreneurial outcomes as well with an insignificant negative estimate. Also, from Table 4, while FDI remains a standing channel of positive influence within the public institutional framework ($\sigma = 2.94E - 10$, $P < 0.05$) via the three estimates, PPG and economic openness revealed a mixed effect given the three estimates.

The diagnostics test in Table 4 A, B and C revealed consistent and expected estimates required for the validation of the model. The R-square revealed that about 61, 62 and 64 percent respectively in each case of the outcome variables of Tables 4 – which tell the extent of the response variable that is being explained by the independent variables; while the F-test reports the overall significance of the model. Having performed the Hausman's test, and with a significant Chi-square estimate, we reject the null hypothesis in favour of the fixed effect

¹ The results of the GDP as a measure of national income and entrepreneurial outcomes revealed similar estimate with GNI (but for the conservation of space).

estimate; the J-statistic is synonymous to the Sargant test proposed by Arellano and Bond (1991) for panel GMM conditions for decision criterion where the null hypothesis of no significance is accepted; and the AR(2) is an auto-regressive estimate of the second order-depicting the absence of serial correlation within the model.

Verification estimates

Table 5. Entrepreneurship Channels and Entrepreneurship Outcomes (*Verification Estimates*) (source: Authors' computation)

Panel A: Entrepreneurship Outcome through Basic Requirement			
Outcome Variable: GFCF			
Explanatory Variables	Pooled OLS	FE	GMM
$GCFC_{t-1}$			1.341(0.408)***
LHH	-4.667(0.567)***	-2.737(0.912)***	2.019(2.789)***
EQTY	-0.080(0.054)	-0.061(0.127)	-0.016(0.198)***
EDC	-0.067(0.025)***	-0.077(0.053)	-0.032(0.133)**
FDI	0.070(0.027)	0.361(0.032)	-0.065(0.372)***
PPG	-0.048(0.010)***	-0.018(0.746)	-0.073(0.942)**
TRO	0.358(0.070)	0.014(0.068)	0.102(1.384)**
C	23.734(0.583)***	5.377(3.899)*	
Diagnostics			
R-squared	0.1583		
F-statistics	16.308**		
Hausman-Test		10.145	
J-statistics			1.835
AR(2)			5.127
Panel B: Entrepreneurship Outcome through Efficiency Enhancers			
Outcome Variable: GFCF			
Explanatory Variables	Pooled OLS	FE	GMM
$GCFC_{t-1}$			1.462(0.166)***
EDC	-0.038(0.026)	-0.071(0.050)	-0.098(0.561)
FNC	-0.386(0.728)***	-0.292(0.094)***	0.330(0.142)**
ICT	0.035(0.779)***	0.042(1.128)***	-0.066(1.563)
FDI	0.049(0.024)	0.438(0.027)	-0.032(0.537)
PPG	-0.055(0.962)***	-0.381(0.017)	0.203(0.042)
TRO	0.103(0.069)	0.026(0.065)	-0.220(0.390)
C	7.8363(0.482)***	7.583(0.462)**	

End of Table 5

Diagnostics			
R-squared	0.1500		
F-statistics	17.512**		
Hausman-Test		12.067*	
J-statistics			8.272
AR(2)			1.390
Panel C: Entrepreneurship Outcome through Innovation and Institutions			
Outcome Variable: GFCF			
Explanatory Variables	Pooled OLS	FE	GMM
$GCFC_{t-1}$			1.664(0.534)***
R&D	-0.217(0.007)***	0.626(0.057)	0.346(0.017)**
IFC	-0.016(0.010)	0.136(2.339)**	0.861(0.021)
PPC	0.340(0.023)	0.653(0.186)	-0.73(0.053)
FDI	0.761(0.049)	0.504(0.059)	-0.169(0.155)
PPG	-0.034(0.012)***	-0.165(0.069)**	0.081(0.024)
TRO	0.284(0.140)**	-0.240(0.257)	-0.025(0.316)
C	4.693(0.428)**	9.237(0.686)***	
Diagnostics			
R-squared	0.085		
F-statistics	4.935**		
Hausman-Test		18.448****	
J-statistics			11.203
AR(2)			1.764

Note: The standard errors are the values in parentheses; while the superscripts are ***0.01, **0.05, and *0.10).

The verification estimates are conducted using a different response variable – Gross Fixed Capital Formation (GFCF). GFCF has been spotted as a macro-aggregate for innovation since it explains the new investments undertaken within the Asian economies (Akinwale et al., 2012); and as a result, is deemed applicable for the study. A cursory examination of Panel A, Table 5, the GMM estimates appear to be consistent with the findings in Table 4. Going through the basic requirements' channel, apart from basic education (EDC) which is at variance with the a priori expectation, an increase in life expectancy (LHH) in the Asian economies improves entrepreneurial outcomes; while a reduction in inequality (EQTY) also improves entrepreneurial outcomes as regards innovation.

Meanwhile, panel B of Table 5 which captures entrepreneurship channel via efficiency enhancers, access to finance (FNC) and ICT improves innovations, the index higher education

(EDC) had a negative but insignificant estimate. With this insignificant estimate, it is argued that while higher education (EDC) can improve national incomes from investments made, it may not be enough to stimulate innovations significantly within these economies. Therefore, an initial training of the population through basic or higher education will require further training (such as learning by doing, on-the job training and short courses) if education will stimulate innovation in these selected economies.

The verifications for panel C, Table 5, is consistent with the initial estimate. As expected, expenditures made on research and development (R&D) positively and significantly stimulates innovations; while infrastructure (IFC) had a positive but insignificant effect; and democracy index (PPC) maintained a negative but insignificant relationship with innovations.

The import of this findings is that the estimates (given both response variables GNI and GFCF) are to a large extent consistent with each other and can be valid for policy purposes especially with regard to actualizing sustainable development through entrepreneurial developments.

Conclusions

The study has been able to articulate channels for entrepreneurial outcomes for sustainability within the Asian region via the proposed channels by Kelley et al. – which are basic requirements, efficiency enhancers and public institutions.

Following the significant positive effects of health on entrepreneurial outcomes as well the demographic statistics; one can identify sustainability channels for entrepreneurship development in Asia. With an average population growth rate of about 2.5% of population growth, over 50 percent (which is close to 5 billion people) of the world population lives in Asia. This demographic pattern is further reflected in the life expectancy of the Asians which is almost 70 on the average. The population and health structure in Asia are a reflection of increasing number of people surviving to reproductive age, which has been followed by changes in fertility rate and increasing economic activities. These socio-economic trends have extensive impacts on income generation and entrepreneurial inclinations within an economy. Interestingly, Asia is harnessing its population growth for productive purposes; this is reflected in the growth of most economies in Asia in terms of culture, business, and trade. Although our findings revealed a mixed effects of population growth via the three entrepreneurial channels considered, it only shows that successive governments may have to redirect policies more in favour of actualizing a more productive and enterprising driven population growth in the region. Also, the fundamental channels showed that an improvement in income inequality will promote entrepreneurship activities within the region. Although the channels via education revealed mixed effects on entrepreneurial outcome; the message is simple (Aboitiz, 2020).

Apart from consolidating on policies that enhances life expectancy, the government can design policies that goes beyond attaining basic education to education for specific developmental purposes. As seen in the channel for efficiency enhancers, policies that support institutional frameworks for Investment in higher education will aid entrepreneurial outcomes more than the rudimentary basic education. In consonance with the thoughts of previous verifications of Baumol's theory, confirmed impact of institutional quality on both the levels

of productive and unproductive entrepreneurship. The propositions of Baumol are clearly typified by suggesting that government should evolve a public entrepreneurship approach that will bring about institutional reforms instead of expending on investments that promote rent-seeking activities or cause government expenses to go up unnecessarily. Also, the sustainable path is for the government to be entrepreneurial in its governance approach.

As regards doing business and entrepreneurial advancement, the entrepreneurial strides is phenomenal. From the analysis in Table 2, an average of 4.9% FDI flows into the Asian region; while almost domestic credits for private investments grew at about 2%. Indeed, according to Mckinsey and Company report (Mckinsey and Company, 2019a, 2019b), there is an increasing FDI flows into Asia as well as a phenomenal increase in doing of business; because relative to the world markets, Asian economic powers are already trading more with Western companies in terms of exports and bilateral relations. Meanwhile, the public institutions channel revealed that while research and development and infrastructure promoted entrepreneurship outcomes (income and innovation) in the Asian continent, the GMM estimate revealed a negative estimate for the public policy-entrepreneurial outcome nexus for the region.

Hence, to actualize the sustainable development goals through entrepreneurial developments, the proposal on public agents, policy and decision makers acting as stewards as well as planners of resources should be considered; especially as it concerns resources that are commonly or jointly owned by members of a community. Governance within the public space or climes should evolve entrepreneurially such that there beyond the provision of infrastructures, structures and policies that promote income growth and stimulate innovations climate (such as investments in training and retraining of the labour force in new developing and utilizing modern technologies which goes beyond basic structured education as seen in the study) for strategic development outcomes. This will involve the establishment of new public organizations, dynamic approach for the management of public resources and seizing opportunities from spillovers by private actions for the wider good. Definitely, as governance structure begins to evolves with an entrepreneur's mindset, better institutional structures, and a dynamic and integrative fashion in her polity, there will be higher prospects and spillovers for entrepreneurs, business owners and private investors alike to respond accordingly- hence actualizing the vision and efforts towards sustainable development.

Limitations of the study

The study has limited its dimension of sustainability to capture economic dimensions; thereby, leaving out the environmental and social components of sustainability.

Future research possibilities

The study has considered three basic channels of sustainability as posited by Kelley et al. (2011) for the Asian economy; however, the study can be extended on two fronts. Apart from extending the tenets of these channels for entrepreneurship development in some other regions, the horizon of the channels examined can be expanded beyond basic requirements, efficiency enhancers and institutions.

Author contributions

Weichao Cheng contributed to the reviews, data collection and methodological section.

Oluwabunmi Adejumo conceived was responsible for the background, analysis and discussions.

Disclosure statement

There are no issues of conflicting interest.

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APPENDIX

List of the Pooled Asian Countries

- China,
- India,
- Indonesia,
- Pakistan,
- Bangladesh,
- Japan,
- Philippines,
- Vietnam,
- Turkey,
- Iran,
- Thailand,
- Myanmar,
- South Korea,
- Iraq,
- Afghanistan,
- Saudi Arabia
- Uzbekistan,
- Malaysia,
- Nepal,
- Yemen,
- Sri Lanka,
- Kazakhstan,
- Syria,
- Cambodia,
- Jordan,
- Azerbaijan,
- United Arab Emirate (UAE),
- Tajikistan,
- Israel,
- Laos,
- Kyrgyzstan,
- Lebanon,
- Turkmenistan,
- Singapore,
- Oman,
- Kuwait,
- Georgia,
- Mongolia,
- Armenia,
- Qatar,
- Bahrain,
- Timor-Lest,
- Cyprus,
- Bhutan,
- Maldives,
- Brunei.