



Inclusive Innovation Atlas

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Contents

Foreword	6
Executive summary	8
1 CONCEPTUAL REPORT	18
1.1 Introduction	18
1.1.1 Background of the debate	19
1.1.2 Driving and enabling factors for inclusive innovation	20
1.2 Two-step approach	22
1.2.1 Status quo analysis	22
1.2.2 Atlas of potentials	23
1.3 Detailed, literature-based justification of the selection of indicators for the atlas of potentials	24
1.3.1 Challenges triggering and driving inclusive innovation	26
Poor infrastructure / harsh environment	27
Low level of socioeconomic development	28
Vulnerability and disparities	29
1.3.2 Capacity factors enabling inclusive innovation	30
Preference for change	31
Absorptive capacity for innovation	33
Robust institutions and governance	34
2 FINDINGS	36
2.1 Introduction	36
2.2 Asian countries: between challenges and capacities	37
2.2.1 Evidence of existing activities	37
2.2.2 Evidence-based assessment of future potential	38
2.2.3 Relevant local challenges	40
2.2.4 Capacity factors enabling entrepreneurial responses	42
2.2.5 Overall findings	44
2.2.6 Selected country profiles	45

ANNEX: METHODOLOGY	48
1 Introduction	48
2 Measuring potentials for inclusive innovation (Based on available statistical and survey data)	50
2.1 Toward a composite indicator	52
2.1.1 Concept-driven, manual pre-selection	52
2.1.2 Data collection and standardization	52
2.1.3 Consolidation of data	54
2.2 Final list of indicators and indicator description	58
2.3 Aggregation, normalization and calculation of index values for final aggregate atlas dimensions	61
3 Measuring the current extent of activities (dedicated survey for this study)	64
4 Indicator Details	68
4.1 Indicators for the dimension “Challenges I – poor infrastructure / harsh environment”	68
4.2 Indicators for the dimension “Challenges II – low socioeconomic development”	70
4.3 Indicators for the dimension “Challenges III – vulnerability and disparities”	73
4.4 Indicators for the dimension “Capacity I – preference for change”	75
4.5 Indicators for the dimension “Capacity II – absorptive capacity for innovation”	81
4.6 Indicators for the dimension “Capacity III – robust institutions and governance”	83
References	86
List of figures and tables	89
Publication details	91

Foreword

Here is one vision of the future of innovation: a terracotta clay refrigerator, developed in India, that keeps milk, fruits and vegetables cool without using a single watt of electricity.

Simple, inexpensive and targeted at low-income populations, this is strikingly different from the high-tech paradigms of disruptive innovation that sometimes result in the elimination of jobs and the displacement of workers. Instead, it exemplifies a practice of inclusive innovation that is spreading with particular vigor across Asia today. It is driven by the imperative to provide sustainable, commercially viable products and services to customers who may otherwise be excluded from mainstream economic participation.

Because such activities have considerable potential to promote inclusive and ecologically sustainable social development – providing jobs and livelihoods while simultaneously expanding access to important goods and services – they have drawn increasing attention in the media and in the academic literature. Yet beyond the identification of a number of encouraging examples, little systematic knowledge has been compiled regarding the scope of such practices or the circumstances that enable them.

The Inclusive Innovation Atlas is an effort to fill this gap. The work emerges from the Bertelsmann Stiftung's broader focus on innovation as a means of promoting globally inclusive well-being, and complements projects such as the Social Cohesion Radar, the Reinhard Mohn Prize 2020 on global innovation strategies, and the Germany and Asia Program more generally. The world's economic center of gravity is shifting toward Asia, and we believe that an improved understanding of the conditions facilitating inclusive innovation will help foster policies and programs that support more inclusive growth, there and elsewhere.

Our model and observations are based on two key assumptions. First, innovation, inclusive or otherwise, is produced by people or organizations seeking to address perceived needs or challenges in their environments. Second, the environment itself must facilitate the development of concepts into marketable products or services; that is, overly restrictive or unstable conditions will tend to hinder such activities. These can be viewed as the two dimensions – that of “challenges” and “capacities” – that together define a country’s potential to generate inclusive innovation.

In one section, the Atlas evaluates 21 Asian countries’ potential for such innovation on the basis of these two dimensions, each of which is operationalized and measured using specific data-driven indicators derived from the subject-area literature. A second section then assesses the actual prevalence of such activities in these countries, based on a newly conducted survey of country experts including impact investors, NGO workers and academics.

The results provide the first large-scale, comparative look at inclusive innovation across the region as a whole, from Iran and Laos to India and China. The study identifies the countries in which such activities are likely to emerge, as well as the environmental factors most conducive to their success. Furthermore, it cuts through the fog of political rhetoric to show which countries are in fact producing such inclusive product and business-model innovations today.

While certainly of academic interest, the Atlas’ results are above all intended to spark future action. We hope its findings will guide philanthropists and impact investors as they decide where and how to allocate funding and resources related to these topics. The comparative approach may additionally prompt policymakers to improve their environments so as to take advantage of inclusive innovation’s bottom-up development dynamic.

Our intention is to add light and fuel to discussions on innovative innovation around the world. We strongly believe that we can all benefit from inspiration wherever it may arise, and in whatever form. To meet the era’s mounting challenges, ongoing innovation will be necessary, no matter where we live – the more inclusive the better.



Stephan Vopel
Director
Program Germany and Asia,
Program Living Values

Executive summary



Background, motivation and definition

In recent years, observers everywhere have watched with fascination Asia's rapid economic ascent and its impressive performance on several social indicators. Across Asia, more and more people are not only living longer, they are increasingly able to take part in and contribute to economic and social life. Creating greater participatory opportunities for those who are otherwise economically marginalized through new products and services – also known as inclusive innovation – has been identified as a key factor driving this remarkable success. The potential inclusive innovation bears in a region expected to drive 40% of global consumption by 2040 (MGI, 2019) is massive and is of growing interest to decision-makers in the public and private sectors of so-called developed countries.

In both the political domain and the impact investment community, “inclusive innovation” has become a much-debated phenomenon in recent years. In academic discussions, the term stands side by side with related, yet not identical concepts of “frugal” and “jugaad” innovation (Brem and Wolfram, 2014). In contrast to these concepts, however, the concept of inclusive innovation has remained a somewhat “weakly defined” (Chataway et al., 2013) area of inquiry. As a result, inclusive innovation has represented a difficult-to-measure opportunity for business and society.

This Atlas for Inclusive Innovation set out to amend this persistent fuzziness, first by clarifying our fundamental understanding of what inclusive innovation is and then by providing concrete evidence of triggers, enabling conditions and activities in the field in different countries.

In line with the core proposition of frugal innovation, inclusive innovation thus relates to innovation activities performed with the ambition to provide “**more for more for less**” (Radjou/Prabhu, 2015) – that is, to conceive *more* functional solutions that are accessible to more customers, as they require *less* resources and come at a lower price. At its core, **the concept suggests that serving the needs of the less wealthy – or even genuinely poor – need not necessarily be a matter of charity.** In practice, inclusive ventures as well as established corporates have demonstrated that **innovating for those otherwise excluded from consumption can be a profitable business model.** Where developers address simple, yet prevalent needs

smartly, development costs remain limited and can be swiftly offset by the large numbers of additional customers reached by the newly provided solutions, even if individual margins are low.

More explicitly than frugal innovation which – in a first step – focuses on commercial viability, inclusive innovation is more directly **associated with “doing good” or at least with taking a societal perspective when starting activities**. Indeed, inclusive innovations arguably provide a more lasting and systemic contribution to resolving societal challenges than do traditional charities. In short, **reconciling commercial viability with societal development within one business model is the core proposition of inclusive innovation**. It highlights and heralds the potential of individual entrepreneurship (both private and public) in addressing societal challenges and in contributing to the pervasive delivery of sustainable solutions in the social, economic and environmental domains.

Accordingly, the following report defines inclusive innovation as follows:

As an objective, inclusive innovation seeks to provide sustainable solutions to those who would otherwise remain excluded from access to offers as a result of their social, economic or environmental context. As an activity and business model, it reconciles the goals of commercial viability with sustainable societal development.

Approach and ambition

By means of a two-step approach, the Inclusive Innovation Atlas offers two important perspectives on the development of inclusive innovation practices. First, it provides evidence of existing activities, cutting through the veil of political rhetoric to look at the genuine impact they have on socioeconomic development. Second, it provides an evidence-based assessment of individual countries’ specific potential to take advantage of inclusive innovation opportunities in the future. Irrespective of the current level of activities, socioeconomic conditions inevitably vary from country to country; these differences can in turn be analyzed with a view to identifying advantages or disadvantages for future inclusive innovation initiatives.

Empirically, insights on the first perspective (activities) are drawn from a broad-based survey of experts conducted in early- to mid-2018. By means of this survey, 77 responses were collected for 21 countries across Asia, compiling close to four answers per country on average. Thus, the Inclusive Innovation Atlas can draw on an unprecedented wealth of country-specific expert assessments from diverse national contexts.

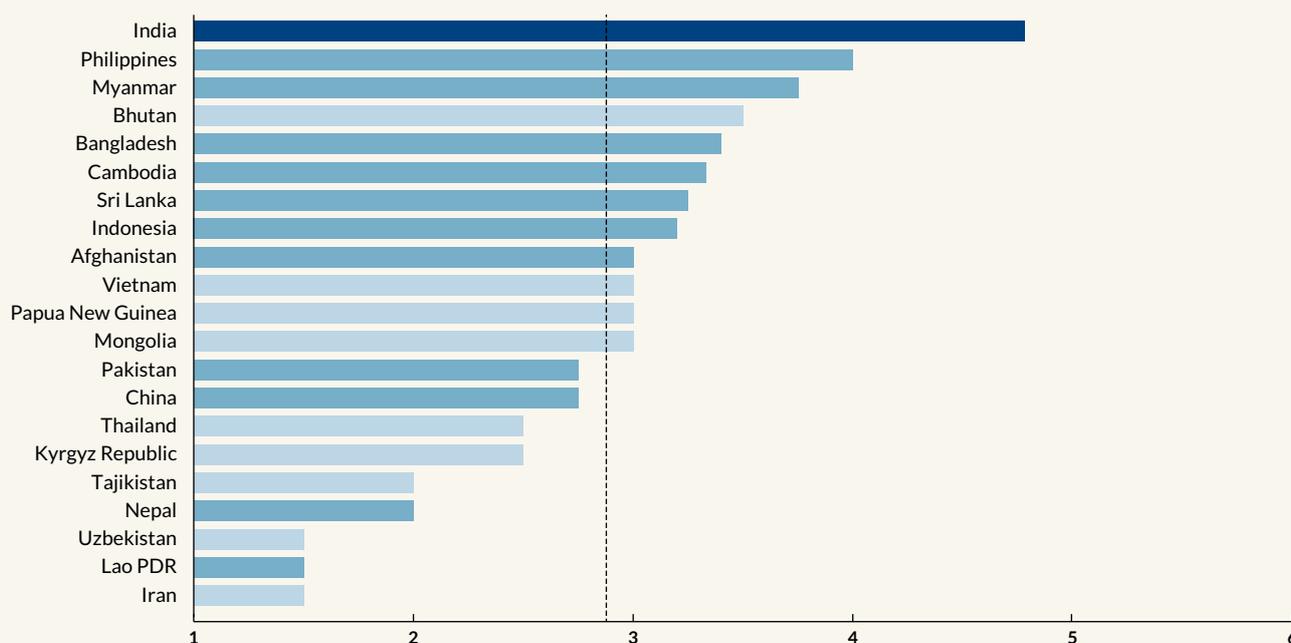
Additionally, insights on the second perspective (potentials) are developed based on an aggregation of specific indicators from a diversity of well recognized sources, including the World Bank Group, the United Nations, the World Economic Forum, the World Values Survey, the International Monetary Fund, Transparency International and the Global Footprint Network. Some of them also include findings from the abovementioned survey. Overall, the Inclusive Innovation Atlas aggregates a total of 72 individual indicators based on a meticulous consideration of conceptual substance and proven empirical relevance.

Perspective 1: Evidence of existing activities

As Figure 1 illustrates, the Inclusive Innovation Atlas confirms prevailing assumptions that India, the Philippines and Indonesia are countries with an above-average level of inclusive innovation activity. Among these, India stands out as the country with the highest level of activities that can be deemed “inclusive.” Furthermore, the analysis reveals a strong presence of such activities in Myanmar, Bhutan, Bangladesh, Cambodia and Sri Lanka. Interestingly, notable levels of activity are also reported in several countries that have not previously been closely associated with this topic, including Afghanistan, Vietnam, Papua New Guinea and Mongolia.

In part, these findings can be explained by the fact that political rhetoric on the topic of inclusive innovation is not always related to the intensity of actual activity (Figure 2). In India and the Philippines, a high level of political attention matches an equally high level of entrepreneurial activities. At the other end of the scale, a similar alignment is found in countries such as Laos, Iran and Uzbekistan, where limited entrepreneurial activities are matched by a low level of interest at the policy level. At the same time, some countries display high levels of inclusive innovation despite the absence of or limited political attention paid to the concept. Starting with Papua New Guinea and Indonesia, this group also includes Cambodia, Thailand and the Kyrgyz Republic. Conversely, China’s leadership has recently attributed increased importance to inclusiveness, while actual activities in this domain remain underdeveloped, or have at least escaped the Atlas’ survey.

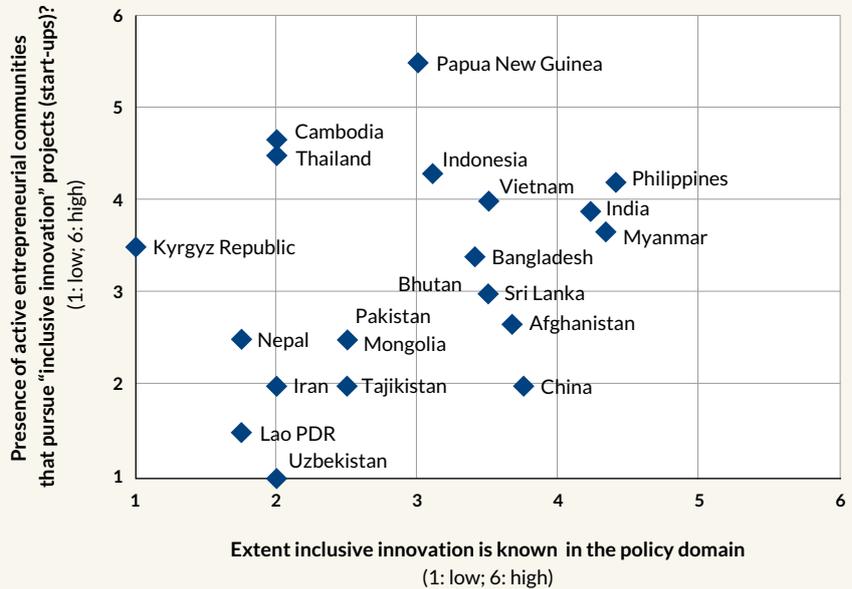
FIGURE 1 Overall level of inclusive innovation activities, from 1 (very low) to 6 (very high)



Source: Fraunhofer ISI analysis based on survey data collected by Fraunhofer ISI and Intellectap

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FIGURE 2 Entrepreneurial activities vs. acknowledgment in the policy domain



Source: Fraunhofer ISI analysis based on survey data collected by Fraunhofer ISI and Intelicap

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Perspective 2: Evidence-based assessment of future potential

For inclusive entrepreneurship to thrive and succeed, countries must fulfill two main criteria. On the one hand, they must display a certain level of social, economic and environmental challenges that trigger responses in the form of entrepreneurial action. These can be subsumed under the heading of “local challenges.” On the other hand, inclusive innovation depends on a number of factors that permit and enable entrepreneurial responses. These can be subsumed under the heading of “capacity factors.” Local challenges that could trigger inclusive innovation include insufficiently developed infrastructures, an overall lack of socioeconomic development, and disparities that exclude certain parts of the population even in otherwise wealthy countries. Capacity factors include cultural attitudes that favor or inhibit inclusive endeavors, the absorptive capacity of local industry with regard to alternative solutions that quite often involve knowledge transfer, and the quality of the governance and institutions that affect all entrepreneurial activity, including inclusive entrepreneurship.

The following Figure 3 illustrates how these different aspects are considered as sub-dimensions of “local challenges” and “capacity factors.” The subsequent sections provide an overview of the surveyed countries in terms of these two overarching perspectives as well as details regarding the respective sub-dimensions.

FIGURE 3 Local challenges and capacity factors as triggers and enablers of inclusive innovation

CHALLENGES			CAPACITIES		
					
POOR INFRASTRUCTURE / HARSH ENVIRONMENT	LOW LEVEL OF SOCIOECONOMIC DEVELOPMENT	PREVALENCE OF VULNERABILITY AND DISPARITIES	CULTURAL / SOCIETAL PREFERENCE FOR CHANGE	ABSORPTIVE CAPACITY FOR INNOVATION	ROBUSTNESS OF INSTITUTION AND GOVERNANCE
Indicator Challenge.1.x	Indicator Challenge.2.x	Indicator Challenge.3.x	Indicator Capacities.1.x	Indicator Capacities.2.x	Indicator Capacities.3.x
Indicator Challenge.1.y	Indicator Challenge.2.y	Indicator Challenge.3.y	Indicator Capacities.1.y	Indicator Capacities.2.y	Indicator Capacities.3.y

Source: Analysis by Fraunhofer ISI

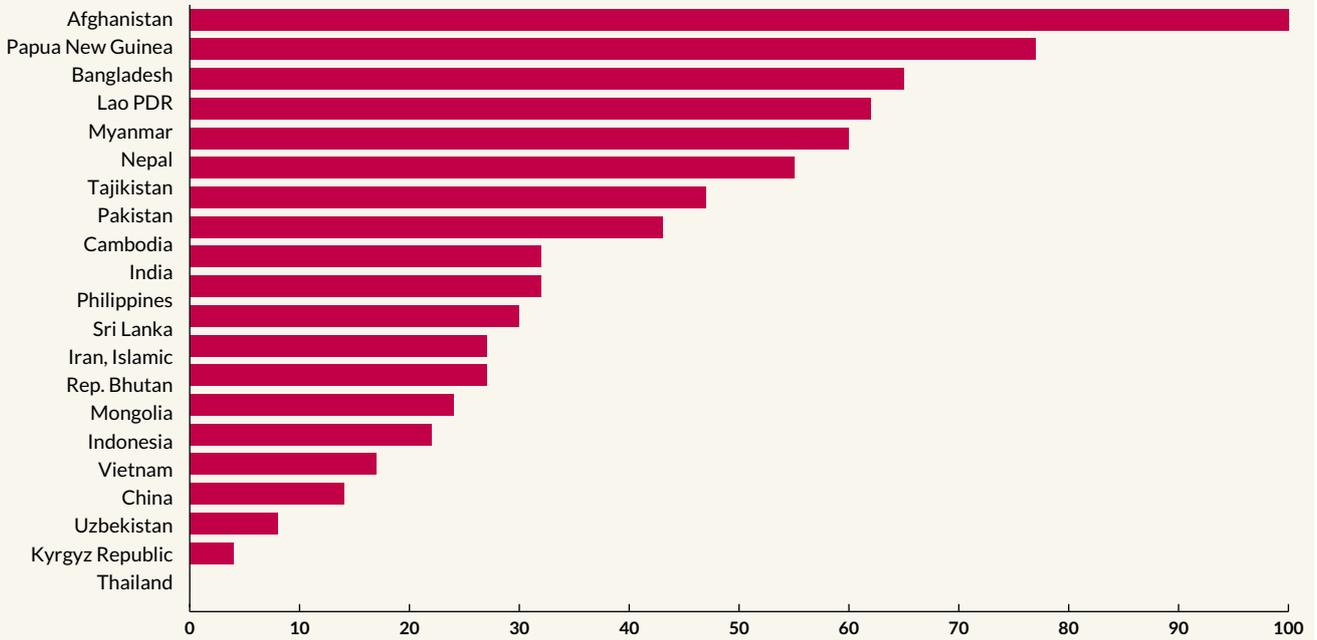
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Relevant local challenges

Overall, local challenges are most severe in Afghanistan, Papua New Guinea, Bangladesh and Laos, while they are mildest in Vietnam, China, Uzbekistan, the Kyrgyz Republic and Thailand. Quite clearly, the findings indicate that the overall urgency of societal issues and thus, implicitly, the impetus to engage in entrepreneurial responses, varies significantly across Asian countries. Remarkably, most of the countries known internationally as hotspots of inclusive innovation (i.e., India, Indonesia, the Philippines) do not display an above-average severity of challenges, at least within the analyzed group of countries – which, however, excludes Asia's most developed nations. However, countries such as China and Thailand distinguish themselves from most of the others by the relatively mild intensity of their local societal challenges.

When examining the specific sub-dimensions, the Atlas finds that Bangladesh, Nepal, India, Afghanistan and Myanmar face the greatest hurdles with respect to environmental conditions and infrastructure. With regard to overall socioeconomic development, the greatest challenges are evident in Afghanistan, Laos, Tajikistan, Bangladesh and Papua New Guinea. In the area of disparities and specific-group vulnerabilities, Afghanistan, Papua New Guinea, Laos, Nepal and Myanmar are least favorably positioned. While the group of countries facing great difficulties in this area is thus to a certain extent consistent across sub-dimensions, differences in emphasis are clearly detectable.

FIGURE 4 Overall severity of local challenges, according to the Inclusive Innovation Atlas



Source: Analysis by Fraunhofer ISI

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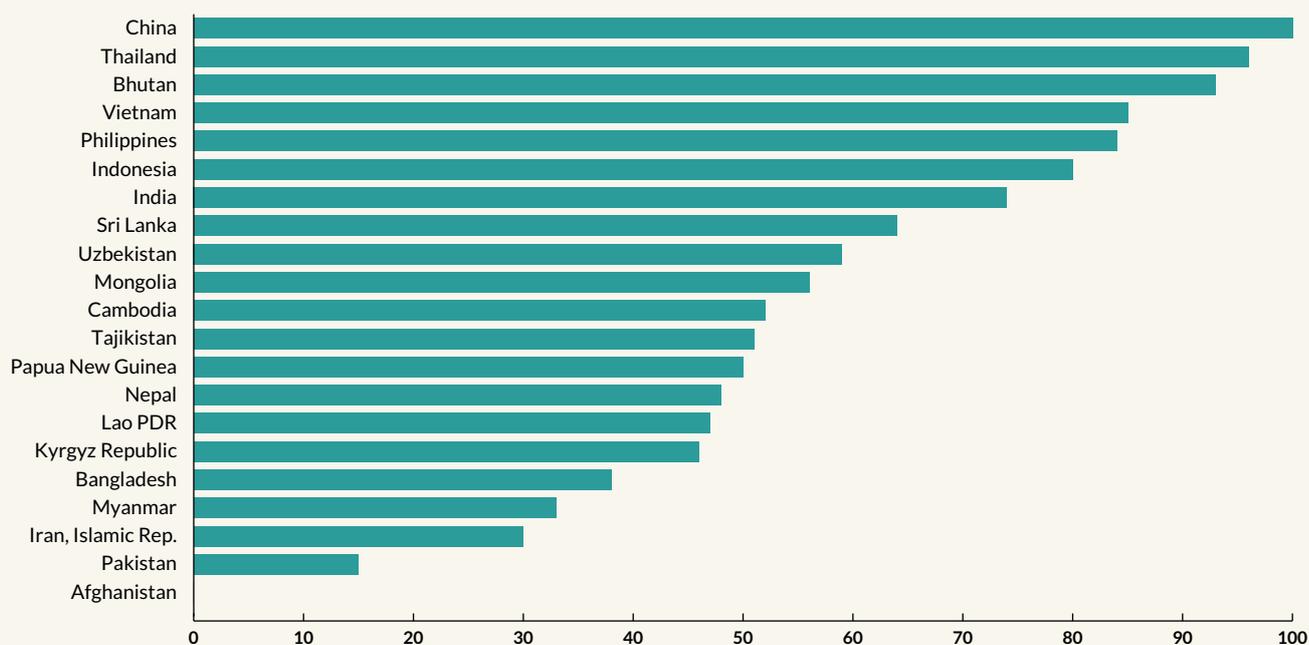
Capacity factors enabling entrepreneurial responses

Overall, capacity levels are highest in China, Thailand, Bhutan, Vietnam and the Philippines, and are lowest in Bangladesh, Myanmar, Iran, Pakistan and Afghanistan. Quite clearly, the findings indicate that the overall capacity to permit, enable and appreciate entrepreneurial responses to societal challenges differs strongly across Asian countries. Unsurprisingly, most of the countries known internationally as hotspots of inclusive innovation indeed display comparatively high capacity values. These include India, Indonesia and the Philippines, which collectively trail China, Thailand, Bhutan and Vietnam, countries with notably less severe societal challenges. Conversely, several countries in which severe societal challenges might in theory provide substantial impetus to engage in entrepreneurial responses display very low levels of capacity; this means that inclusive innovation activities there are likely to face greater practical obstacles, both with regard to enterprise creation and ongoing operations. Examples here include Afghanistan, Pakistan, Iran, Bangladesh and Myanmar.

An examination of the individual sub-dimension indicates that the general culture is considered most conducive to inclusive innovation in Bhutan, Vietnam, Cambodia, the Philippines and Mongolia. However, while cultural factors are thus regarded as being reasonably supportive in the Philippines, other nations closely associated with inclusive innovation, including India and Indonesia, still face notable obstacles in this area. The level of absorptive capacity is highest in China,

Indonesia, Thailand, India and the Philippines. Finally, governance practices and institutions are considered to be most reliable in Bhutan, Thailand, Uzbekistan and China.

FIGURE 5 Overall level of relevant capacity, according to the Inclusive Innovation Atlas



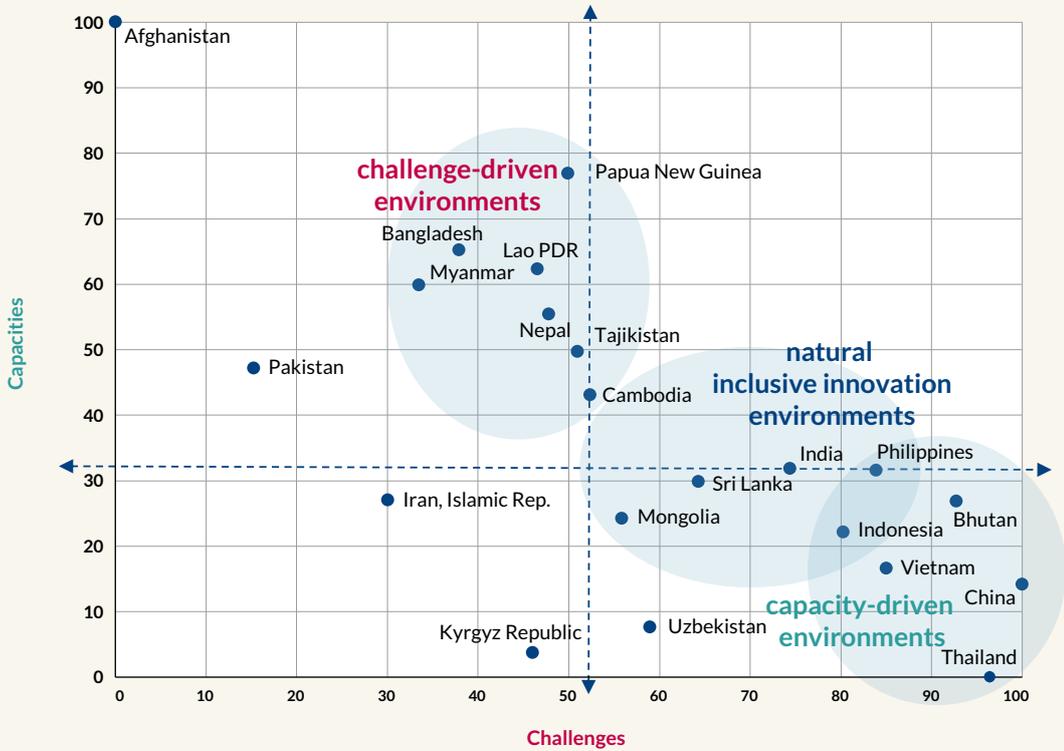
Source: Analysis by Fraunhofer ISI

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Different types of potential for inclusive innovation

By integrating the perspectives of challenges and capacities, three main groups of countries can be identified with a view to the nature of their future potential for inclusive innovation activities. The first cluster is a group of countries showing significant challenges combined with capacity levels high enough that they are no longer prohibitive. This group of countries can be referred to as environments with challenge-driven opportunities, including Bangladesh, Laos, Myanmar, Papua New Guinea, Nepal, Tajikistan and Cambodia. The second cluster encompasses a number of countries with less severe but still very real challenges, along with somewhat higher capacity levels. This group of countries can be referred to as natural environments for inclusive innovation, including India, Indonesia, the Philippines, Sri Lanka and Mongolia. The third cluster comprises countries with above-average levels of capacity and challenges still significant enough to provide entrepreneurial motivation. This group can be referred to as environments with capacity-driven opportunities, and includes Bhutan, Vietnam, China and Thailand. Arguably, Indonesia and the Philippines could also be considered part of this category.

FIGURE 6 Country clusters defined by opportunities for inclusive innovation



Source: Analysis by Fraunhofer ISI

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Summary and conclusions

In summary, the Inclusive Innovation Atlas demonstrates that inclusive innovation is a complex phenomenon that requires a good balance of challenges and capacities so as to neither stifle innovative activity altogether nor render an inclusive orientation obsolete due to higher levels of development in local societies and markets. Understanding the contextual factors affecting inclusive innovation in specific countries is of relevance to all stakeholders considering any engagement in such activities. In order to ensure long-term success with beneficial outcomes, policymakers, entrepreneurs and civil society organizations alike must tailor their inclusive innovation efforts to the needs of each local environment and its organizational or regulatory framework. While capacity-driven environments may appeal naturally to corporates, natural inclusive innovation environments may be a good match for impact investors, and challenge-driven environments may still require a slightly different impetus typically found among humanitarian support organizations or other NGOs. Strengthening measures that raise awareness of inclusive innovation and bring together potential partners will prove important here.

At the same time, there are diverse combinations of findings on the six sub dimensions that identify potential in the Inclusive Innovation Atlas. This clearly demonstrates that no single country is alike. Capacity-driven environments may

harbor more difficulties than initially expected, and challenge-driven environments may offer more niches for commercially viable activities than anticipated based on aggregate figures. The Inclusive Innovation Atlas is therefore most useful in practice if all the information regarding a specific country of interest is considered in detail, read against the grain of other situations and, then, subsequently, followed up by in-depth discussions with local experts and practitioners. Efforts to improve comprehensive data collection across cultural contexts will prove important in order to provide reliable evidence-based information for those tasked with making budgetary or planning decisions regarding inclusive innovation activities.

Finally, the study also suggests that countries such as Germany and economic regions such as the EU could benefit from exploring the how, why and where of inclusive innovation that is pursued in Asia. Such considerations can help decision-makers in Europe more broadly make informed decisions about how to promote inclusive innovation at home as part of a larger effort to create greater social, economic and environmental sustainability for everyone. Given the portfolio of technologies and high-end premium products already established in European countries, these states would be well-advised to draw on their strengths in terms of technology development while promoting resource-efficient services and products that can be used by a larger share of the population. This involves developing policies that encourage the development of smart solutions and products with limited resource inputs that are developed with environmental and social stability in mind.

1 CONCEPTUAL REPORT

1.1 Introduction

In recent years, the topic of inclusive innovation has become increasingly prominent in academic discussions. Following the appearance of a number of widely read publications, the notion of generating “more for more for less” by conceiving innovation from an impact perspective appeared appealing to many. Moreover, the idea of replacing charity with entrepreneurial savviness and empowering opportunities for self-realization seemed to suggest a new, promising take on development support that resonated with many aid organizations’ established convictions.

Despite the prominence of the topic in both the academic discourse and the media, most propositions associated with inclusive innovation in fact remain based on a relatively small amount of empirical evidence. To date, most key publications in the area have limited themselves to citing various examples of (presumably) good practice, ranging from the Jaipur leg to the Mitticool refrigerator and the (effectively failed) Tata Nano. Most if not all such examples are drawn from India, and despite providing succinct and colorful descriptions of the solutions, the citations remain comparatively parsimonious with regard to documenting actual economic impact. Consequently, the most we can confidently say about inclusive innovations is that a number of them undoubtedly exist – predominantly in India – and that some of them have been moderately successful in economic terms.

That said, inclusive innovation is indeed a phenomenon that does not lend itself readily to quantitative measurement. Fundamentally, it is defined not by its substance, but by the effect it causes (or is intended to cause), and thus necessarily eludes measurement though the uses of standard innovation benchmarks such as patents. The technological content of inclusive innovations can differ substantially, with the main emphasis in some cases being on business models rather than products; moreover, in many cases, it is effectively unclear whether the results are in fact conceived as inclusive solutions by their initial creators. Not uncommonly, that description is given to them only at a later stage, after such effects accidentally develop.

While there are a number of “impact investors” and “impact entrepreneurs” in various developing and emerging countries that might be counted in the category, a focus solely on these entities would fail to acknowledge the inclusive innovation that in a significant number of cases is produced by large corporations. In general,

moreover, it would be a mistake to attribute inclusive innovation exclusively to those intending to do good – not least because such activities have been found to be much more effective in cases where profit motives played at least a secondary role.

As a result, relatively little is known not only about the prevalence, but also about the perceived relevance of inclusive innovation beyond certain key areas. Even within India, the extent to which the recent hype around the phenomenon can provide seeds for transformative change remains unclear, as opposed to having simply brought to light a practice that existed before but will – now and in the future – do little to affect the overall workings of the economy. Outside India, we often know only that some obvious cases exist. As the phenomenon either has not been discussed in the same terms, or has not received a comparable quantity of public attention, it is elsewhere much less visible, even if not necessarily less present or relevant.

In any case, policymakers and investors abroad have little point of reference as to whether the approach should be considered for a certain target market. Against this background, the Inclusive Innovation Atlas not only explores countries' current and future potentials for inclusive innovation based on secondary data, but also collects and aggregates diverse expert opinions on the prevalence of the phenomenon, thereby addressing the issue from various perspectives.

1.1.1 Background of the debate

In the political domain, “inclusive innovation” has become a much-debated phenomenon in recent years, alongside other related concepts such as frugal innovation, jugaad innovation, reverse innovation and Shanzhai (Brem and Wolfram, 2014). As compared with these other concepts, however, the academic research on inclusive innovation has remained limited, with literature reviews describing it as a “weakly defined area of inquiry” (Chataway et al., 2013). Hence, a certain degree of fuzziness has remained with respect to its definition, which our report will seek to amend. Some of the available definitions include:

- *Innovations which are “not new to the world but [which reflect] local circumstances” (OECD, 2014).*
- *“Knowledge creation and absorption efforts that are relevant to the needs of the poor” (Dutz, 2007).*
- *Innovation that targets the “poor and excluded [or otherwise] disenfranchised members of society” (Rocha Carrasco, 2018).*
- *An innovation whose intention “is to address the needs or wants or problems of the excluded group” (Heeks et al., 2013).*
- *An innovation that “addresses the needs of persons with low incomes” (Dahlman, 2014).*
- *“The use of technology to skill and empower workers at the bottom and middle of the economic spectrum” (MIT, 2018).*

In line with the core proposition of frugal innovation, inclusive innovation relates to innovation activities performed with the ambition to provide “**more for more for less**” (Radjou and Prabhu, 2015); that is, to conceive *more* functional solutions

accessible to *more* customers due to a *lesser* price. At its core, **the concept suggests that serving the needs of the less wealthy – or even genuinely poor – need not necessarily be a matter of charity.** In practice, various inclusive ventures have demonstrated that **innovating for those otherwise excluded from consumption can be a profitable business model.** Where developers address simple needs smartly, development costs can be held to a minimum, and are swiftly offset by the large numbers of additional customers reached by the newly provided solutions – even if margins on individual products are low.

While frugal innovation more strongly emphasizes commercial viability, much of the literature associates inclusive innovation more directly with the aspect of **“doing good,”** or at least with **taking a societal perspective as the primary motive for initiating the activity.** Such descriptions underline the conception that inclusive innovations provide an arguably more lasting and systemic contribution to addressing societal challenges than does traditional charity.

Hence, in summary, **the core proposition of “inclusive innovation” lies in this reconciliation of commercial viability with sustainable societal development within a single business model.** The focus on such activities highlights and heralds the potential for individual entrepreneurship (both private and public) to help address societal challenges and contribute to the widespread delivery of sustainable solutions in the social, economic and environmental domains.

In summary, this report will draw on the following definition:

WORKING DEFINITION OF INCLUSIVE INNOVATION

An activity with the objective of providing sustainable solutions to those who would otherwise remain excluded from access to offers as a result of their social, economic or environmental context.

As an activity and business model, it reconciles the goals of commercial viability with sustainable social development.

1.1.2 Driving and enabling factors for inclusive innovation

Fundamentally, a country’s conduciveness to inclusive innovation depends on the extent of existing economic, social or environmental shortcomings that call for a solution. While affordable and robust solutions are attractive to many people even in comparatively developed economies, the extent of their market appeal and the scope of societal challenges they are able to address are likely to be much greater in less developed environments. Accordingly, the presence of unresolved challenges is a first, necessary condition for making a country a relevant destination or location for inclusive innovation.

However, the presence of challenges (i.e., latent user needs) alone does not suffice to make the prospect of innovating in or for a particular country a promising one. Where cultural factors obstruct innovation processes and creative thinking in

public and private settings, or prevent access to products or services by relevant groups of potential users (e.g., women), theoretical opportunities will be limited or forfeited entirely. Where local firms display no capacity to absorb and implement new ideas, or when there is a shortage of qualified people able to mediate between entrepreneurs, developers and future users, genuinely inclusive innovation processes will be difficult to establish. Finally, widespread corruption, poor governance and regulatory failures may obstruct all business activity, and thus also prevent the emergence of successful ventures inspired by inclusive innovation.

DRIVING AND ENABLING FACTORS FOR **INCLUSIVE INNOVATION**

In short, the likelihood of the emergence of inclusive innovation ventures in a country depends first on the **presence of local challenges (which in turn imply the presence of potential users)** and second, on the **scope afforded to motivated entrepreneurs to operate freely**.

Of these conditions, the **presence of challenges, and thus latent user demand, is the necessary and fundamental one**. However, it does not suffice on its own. As is true of all entrepreneurial activity, inclusive innovation can be inhibited by overt uncertainty (e.g., in failing states) or overly restrictive environments (e.g., in conservative authoritarian states).

It is against this background that the *Inclusive Innovation Atlas* maps out Asian countries' positioning along these dimensions in a manner that may be instructive for policymakers, managers or entrepreneurs considering launching or supporting activities in the field of inclusive innovation. Furthermore, it provides an illustrative account of inclusive innovation activities currently underway, based on an online survey and a number of interviews.

In the following sections, we will describe the dimensions of *triggering or driving challenges* (i.e., the presence of economic, societal and environmental challenges) and *enabling capacity factors* (i.e., the presence of social and economic conditions that enable relevant innovation activities) in more detail. Moreover, we will outline and justify the detailed construction of the indices used, and all relevant aspects considered.

1.2 Two-step approach

With the publication of the Inclusive Innovation Atlas, the Bertelsmann Stiftung aims to raise awareness of inclusive innovation as an important approach to the development of markets and societies in Asian nations, and additionally as a learning opportunity for Europe. While highlighting the importance of India as a “lead market” and key “field of learning” in this domain, the study will emphasize that the issues and opportunities being discussed are in principle equally relevant within a number of other Asian nations.

Overall, the study has two main purposes that will be introduced below.

1.2.1 Status quo analysis

This is used to **outline the current level and relevance of inclusive innovation activities** in Asian countries, based on the most **comprehensive expert survey** carried out on this issue to date. The survey draws on expertise from entrepreneurs, aid workers and academics.

Based on the expert survey’s findings, the status quo analysis address the following elements:

- Current relevance and level of inclusive innovation activities.
- The extent to which the topic of inclusive innovation is familiar and has been taken up....
 - ...in the policy domain.
 - ...by domestic corporations.
 - ...by foreign corporations.
- The prevalence of specific (or suitable) support programs for inclusive innovation.
- Overall entrepreneurial spirit.
- The prevalence of entrepreneurial communities pursuing inclusive innovation.
- Availability of finance suitable for the needs of inclusive innovators.

The technical details of the survey are documented in a separate methodological report.

1.2.2 Atlas of potentials

This is used to assess the degree to which the various Asian countries are **likely to develop further** as environments for inclusive innovation, based on a **detailed analysis of challenges and the existing potential for inclusive innovation**.

The conceptual approach for the atlas of potentials was developed based on in-depth literature studies and empirical inquiries conducted in close collaboration with academic authorities and practitioners from the fields of frugal innovation, jugaad innovation and inclusive innovation itself.

The conceptual insights that inform the atlas will be outlined in the subsequent chapter of this report. Further details on the technical formation of specific indicator components can be found in a separate methodological report.

1.3 Detailed literature-based justification of the selection of indicators for the Atlas of Potentials

In constructing a conceptual foundation for the selection of individual indicators for an Inclusive Innovation Atlas, it was clearly important to base the project's structure on core premises of inclusive innovation as established by the academic debate. Thus, in order to put the planned atlas on a robust footing, relevant generic contributions (e.g., George et al., 2012; Mitchell and McGahan, 2014; Soni and Krishnan, 2014; Radjou and Prabhu, 2015; European Commission, 2016) as well as a number of more specific studies were taken into consideration. In summary, the literature clearly demonstrates that while there is a substantial need for inclusive innovation in many (if not all) countries, local capacities for realizing this potential differ more widely (European Commission, 2016). Moreover, different countries have sought and found a variety of approaches to its realization (e.g., Zhou and Xie, 2012; Crescenzi et al., 2012; Ping, 2013; Mériade, 2016). Consequently, the Inclusive Innovation Atlas is based on **two main dimensions**:

- **Local challenges triggering and driving inclusive innovation.** These are defined by a current state of exclusion – and its likely persistence – that, according to literature and practice, has the potential to trigger and motivate inclusive innovation.
- **Capacity factors enabling inclusive innovation.** These are defined by the presence of enabling or hindering factors that influence opportunities to realize and launch inclusive innovations effectively.

According to distinct yet connected lines of argument established in the literature, each of the two dimensions is **composed of three equally relevant sub-dimensions**, each reflecting independent country characteristics that together contribute to the overall pattern of relevant challenges and capacities. Hence, they can mutually reinforce each other but also moderate one another's effects.

The present **chapter, the Conceptual Report, will explain the overall analytical structure** of the Inclusive Innovation Atlas. This structure constitutes the work's foundation, was conceived at the very beginning of its development, and has remained unchanged since. This section will **derive each of the six main sub-dimensions from the relevant literature**, and thus comprehensively anchor the Inclusive Innovation Atlas in the most up-to-date theory available.

As it addresses each of the six individual sub-dimensions, this section will comment more specifically on the **detailed lines of reasoning suggested by existing theory** that have been expressed in **groups of individual indicators or proxies**. Where appropriate and conceptually necessary, the section will also provide illustrative comments on some of the individual indicators that remain in the final version of the sub-dimensions. In general, however, the detailed selection of specific indicators as opposed to others will be addressed in the Annex.

FIGURE 1 Key dimensions and sub-dimensions of the Inclusive Innovation Atlas

CHALLENGES			CAPACITIES		
					
POOR INFRASTRUCTURE / HARSH ENVIRONMENT	LOW LEVEL OF SOCIOECONOMIC DEVELOPMENT	PREVALENCE OF VULNERABILITY AND DISPARITIES	CULTURAL / SOCIETAL PREFERENCE FOR CHANGE	ABSORPTIVE CAPACITY FOR INNOVATION	ROBUSTNESS OF INSTITUTION AND GOVERNANCE
Indicator Challenge.1.x	Indicator Challenge.2.x	Indicator Challenge.3.x	Indicator Capacities.1.x	Indicator Capacities.2.x	Indicator Capacities.3.x
Indicator Challenge.1.y	Indicator Challenge.2.y	Indicator Challenge.3.y	Indicator Capacities.1.y	Indicator Capacities.2.y	Indicator Capacities.3.y

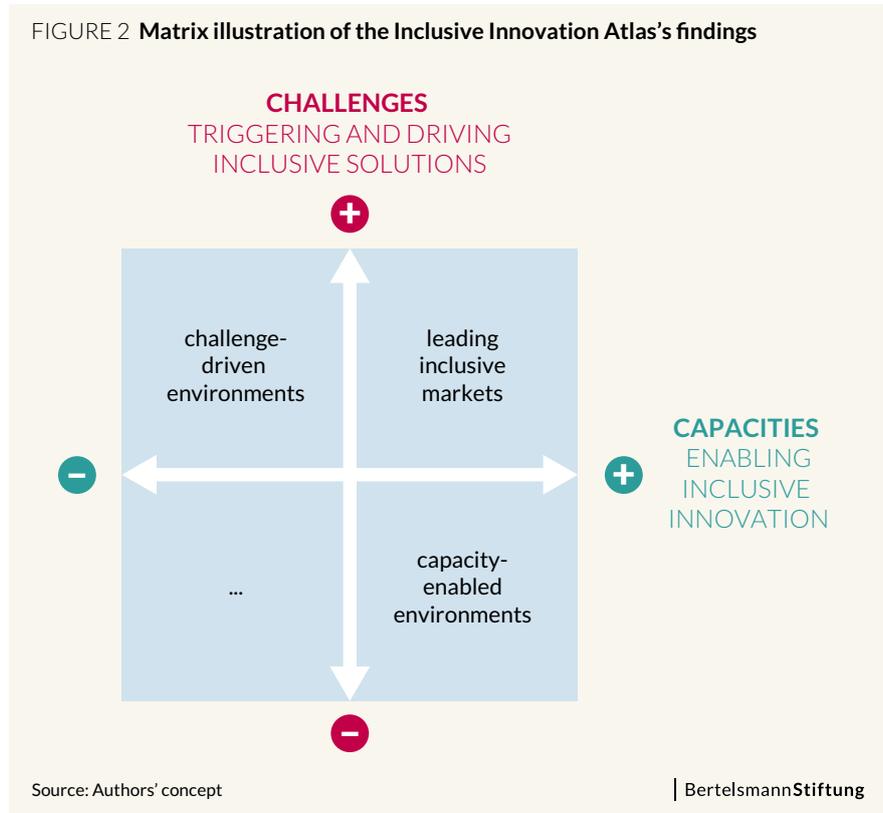
Source: Authors' concept

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Conceptually, **both analytical dimensions have to be understood as largely orthogonal; that is, independent from each other**. In concrete terms, this implies that on the one hand, countries can be in dire need of inclusive innovation and in principle provide great motivation for entrepreneurs to become active, while in practice the underlying social and economic conditions are such that no activity of this kind can be easily realized or produce impact (one example in this respect could be Afghanistan). On the other hand, countries may feature very favorable conditions for inclusive innovators while – possibly due to the success thus achieved – the challenge-based impetus for developing such innovations is diminishing (one example in this respect could be China).

Hence, the results of the Inclusive Innovation Atlas will be presented not in the form of a single index – unduly mixing both areas of analysis – but rather as a **two-dimensional diagram or matrix** that makes it possible to **simultaneously capture the positioning of all countries with respect to both analytical dimensions**, as illustrated on the next page.

FIGURE 2 Matrix illustration of the Inclusive Innovation Atlas’s findings



1.3.1 Challenges triggering and driving inclusive innovation

While a number of generic development indices such as the Human Development Index (HDI) already exist, this study’s approach focuses more precisely on the specific challenges identified in earlier studies as being **triggering and motivating factors for inclusive innovation**.

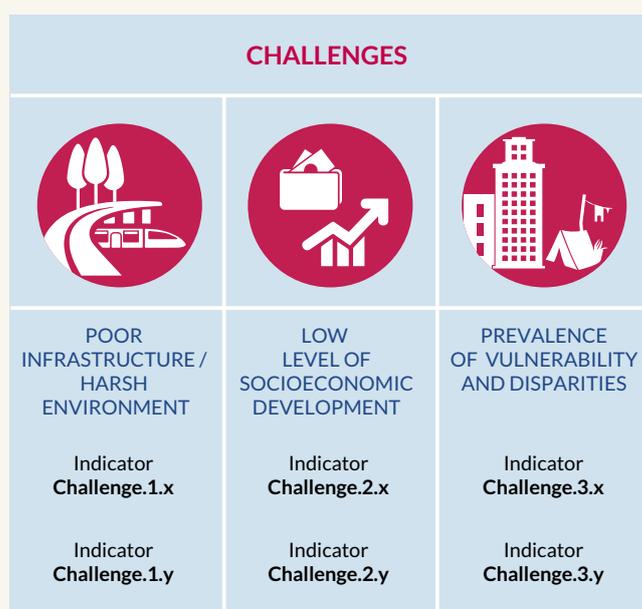
According to the literature, inclusive innovation will often be motivated and triggered by **three characteristic types of situations** that may occur simultaneously and reinforce each other. These situations can be described as follows:

- There is a sizable **“bottom of the pyramid”** population, so that a nation’s society and economy become fundamentally characterized by persons with low incomes.
- The society suffers from considerable **disparities and inequality**, so that sizable parts of the population remain excluded from existing wealth or societal opportunities.
- **Traditional infrastructure** is lacking and/or **environmental conditions** are harsh to an extent that commonly available solutions often lose functionality.

Accordingly, these three elements can be seen conceptually as additive components and combined as sub-dimensions of a composite indicator (“challenges for inclusive innovation”).

To some extent, this composite indicator resembles existing development indices, although it differs in approach. Primarily aimed at establishing a basis for benchmarking, it is derived directly from theory, focusing on issues known to constitute triggering and motivating factors for inclusive innovation. For example, it includes aspects addressing issues of inequality, infrastructure, the environment, emerging middle classes and the likely persistence of current circumstances. While these are present throughout the literature on inclusive innovation, for various compelling reasons they have not been taken into account in prevailing measures of development such as the Human Development Index.

FIGURE 3 Sub-dimensions of the local challenges dimension



Source: Authors' concept

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Poor infrastructure / harsh environment

According to much of the literature, the exclusion experienced by inclusive innovation’s potential users is reflected in low individual incomes, a lack of access to established infrastructures, and a lack of shelter from harsh environments, no matter whether those environmental conditions are naturally occurring or artificially degraded (Roland Berger, 2012; BCG, 2013; Radjou and Prabhu, 2015). Moreover, while not all innovations that are inclusive in a social sense are by definition environmentally sustainable, there is a continued discussion on this issue, and broad academic agreement that they should be (Seyfang and Smith, 2007; Brem and Ivens, 2013; Smith et al., 2014; European Commission, 2016).

With these considerations in mind, we selected indicators in the following three areas:

1. Indicators providing evidence on access to basic infrastructure:

Quality of overall infrastructure, access to water, access to sanitation facilities.

This selection of indicators follows the basic argument that the lack of access to important infrastructures is an expression of need and exclusion; moreover, it is one that directly creates a need to address the obvious hardships in the population's daily lives. Where there is currently no access to water or sanitation, the situation calls for new solutions to provide it.

2. Indicators providing evidence on access to “20th century ICT networks”:

Fixed telephone subscriptions, automated teller machines (ATMs).

This subsection reflects the fact that a lack of access to the ICT networks of the 20th century is known to inspire alternative network solutions. While access to ICT networks is not fundamental for survival, having such access does change daily life and create opportunity. Hence, populations in formerly cut-off areas, who are unlikely to ever gain access to traditional networks, are generally particularly swift to adopt new solutions.

3. Indicators providing evidence on environmental conditions:

Biocapacity Index, environmental risk exposure, air pollution.

This subsection reflects the challenges posed by detrimental environmental conditions for the individuals and groups that must take shelter from them. It starts with an examination of the natural environment's status quo, moves to partially human-caused risk exposure, and finishes with the fully anthropogenic effects of the air pollution characteristic in major emerging economies.

Low level of socioeconomic development

Most of the literature on inclusive innovation practices (e.g., Gupta, 1997) maintains that they should, by definition, address and deliver impact at the “bottom of the pyramid” (Ansari et al., 2012; Bound and Thornton, 2012; Agrawal and Brem, 2012; Prahalad et al., 2012; Brem and Wolfram, 2014; Radjou and Prabhu, 2015). Put differently, activity of this kind seeks to find solutions for application primarily in countries that have a high average prevalence of genuine poverty, and which, in a comprehensive sense, are categorized as being part of the “Global South” (Bhatti, 2012; Cheng and Bradley, 2014; Soman et al., 2014).

With these considerations in mind, we selected indicators in the following three areas:

1. Indicators providing evidence of average poverty levels:

Mean consumption of the bottom 40% of the population, population below \$1.25 (PPP) per day, share of population that is undernourished, share of population having gone without sufficient food.

This first category directly reflects free buying power, narrowing the consideration from general limitations to expenditure (mean consumption), to absolute poverty as defined by international standards, and finally to total deprivation – that is, situations where personal income does not suffice even to guarantee adequate nutrition.

2. Indicators providing evidence on health-related issues:

Infant mortality rate, prevalence of death by injury, tuberculosis prevalence rate.

This second category examines living conditions from a different angle, while at the same time identifying a first central field of application for inclusive innovation. Health is arguably the most fundamental function of human life; where basic health needs are not met, the need to improve access to health-promoting products and services could not be more obvious

3. Indicators providing evidence on prospects for development:

Export Diversification Index, Export Quality Index.

This third category was added to serve as a proxy for the likely persistence of the conditions reflected in categories 1 and 2. As economic research demonstrates, the ability to produce high value-added (i.e., “high quality”) exports strongly influences a lagging country’s prospects for improving its situation.

Vulnerability and disparities

In many Asian countries, portions or even the majority of the less-affluent population may no longer be drastically poor but may, nonetheless, lack access to commonly available products and services. One common reason for this is that individuals’ employment situations or general living conditions may create uncertainty. Importantly, these effects extend far into those segments of the population externally referred to as “emerging middle classes.” Despite that designation, these populations’ living conditions differ markedly from that of middle classes in Europe, Japan or the United States (Kharas, 2010; Ernst & Young, 2011; Agrawal and Brem, 2012; Roland Berger, 2012; BCG, 2013). At the same time, seemingly satisfactory average economic statistics may conceal pockets of actual poverty and dire need – which the consideration of relevant indicators of disparity can help avoid.

With these considerations in mind, we selected indicators in the following three areas:

1. Indicators providing basic evidence on disparities and inequality:

Gini index, income share held by lowest 20%.

In principle, considering these indicators will prevent a nation’s society or economy from being misjudged based on a seemingly high average level of development, which in fact results from a small number of individuals or firms holding or generating wealth without benefiting the broader population and/or economy.

2. Indicators providing evidence on employment conditions:

Employment-to-population ratio, share of vulnerable employment, youth unemployment rate.

Employment guarantees access to income, while stable employment is needed to guarantee access to credit. Employment during one's youth helps shape prospects for later employment. All of these aspects affect "emerging middle classes" directly as much as the prospect of joining them in the first place.

3. Indicators providing evidence on exclusion:

Share of urban population living in slums, share of population using solid fuels.

In the absence of social safety nets, even individuals who are officially above the poverty line can, through migration or a blow of fate, fall into a position of exclusion and vulnerability. This typically involves harsh or difficult living conditions. Hence, these indicators reflect the share of individuals living under unstructured conditions without access to suitable utilities and/or provisions.

1.3.2 Capacity factors enabling inclusive innovation

The literature on inclusive innovation emphasizes that while local challenges (and thus latent user needs) motivate and trigger innovation, various additional factors have to be in place for such activity to become effective and develop social impact (Radjou and Prabhu, 2015; European Commission, 2016; Kroll and Gabriel, forthcoming).

According to the literature, inclusive innovation that effectively produces impact is enabled by **three characteristic social and economic conditions** that may occur simultaneously and reinforce each other. These situations can be described as follows:

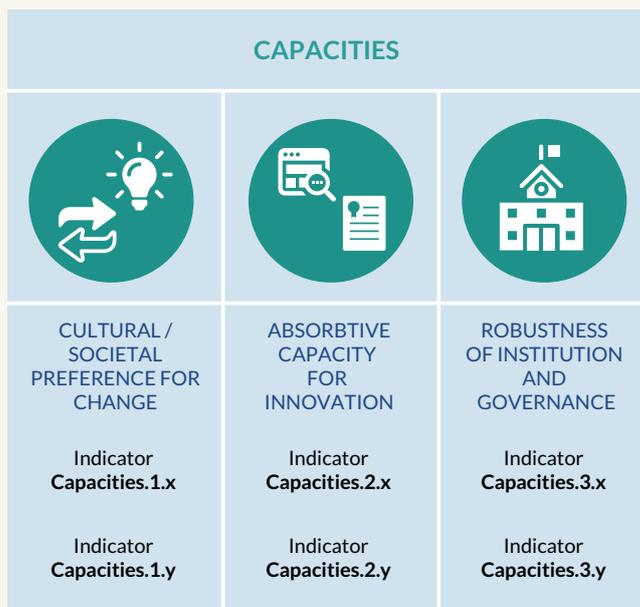
- The overall population displays a **preference for change** sufficiently robust to enable inclusive innovation, and to encourage individuals to choose to use the resulting products or services.
- There is a basic level of **absorptive capacity**; that is, intermediators and "translators" who can enable interaction between innovators and those who use their products and services.
- The prevailing level of **institutional reliability and governance quality** is sufficiently high to avoid inhibiting business processes.

Accordingly, these three elements can be seen conceptually as additive components and combined as sub-indices of a composite indicator ("capacities").

Undoubtedly, many of the arguments made in the following may be more pertinent for innovators external to an environment than for grassroots entrepreneurs embedded within it. The reasoning behind this approach is that, to create broad-based social impact, inclusive innovations have to scale and be deployed in

various settings (Christensen et al., 2006) and must profit from the involvement of new actors as providers of ideas and inspiration (European Commission, 2016). Even locally, it requires the ability of game changers to think outside the box and question established patterns.

FIGURE 4 Sub-dimensions of the capacity dimension



Source: Authors' concept

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Preference for change

As evidenced in the extensive discussion on “jugaad innovation” (Saraf, 2009; Hesseldahl, 2012; Radjou et al., 2012; Radjou and Prabhu, 2015), a specific type of creative mindset is needed to enable inclusive innovation – both within society at large (Gupta, 2008; Hesseldahl, 2012) and inside companies more specifically (Seghal et al., 2011; Kumar and Puranam, 2012; Halme et al., 2012). Where a culture of traditionalism and authoritarianism prevails, individuals and institutions will find it difficult to manifest this necessary creativity (Agrawal and Brem, 2012; Radjou et al., 2012; European Commission, 2016). Furthermore, inclusive innovation is an approach based on entrepreneurship and/or intrapreneurship, and on personal initiative rather than charitable action. As such, it cannot thrive in the absence of basic preconditions known to apply to all innovation, that is, a positive or at least neutral attitude toward individual entrepreneurship and an appreciation for hard work directed toward a purpose. Moreover, innovation that does not follow from a social motive may be successful or even frugal but fail to be inclusive either in character or consequence. Finally, therefore, this subsection needs to address the overall population’s position toward the idea of altruism and social issues (Brem and Wolfram, 2014).

With these considerations in mind, we selected three general characteristics that can be evaluated using indicators available for all countries:

- **Openness toward the use of new, alternative platform technologies:**
Cellular subscriptions, internet users.
- **Persistence of traditional structures and conservative conventions:**
Women in the labor force.
- **Established need to accommodate diversity in society:**
International migrant stock.

Despite some shortcomings, these proxy indicators capture the most relevant dimensions of the reasoning outlined above. However, for a number of relevant countries, a set of better, more focused indicators are also available from the World Value Survey (WVS). These are drawn from:

1. **WVS questions examining the society's regard for creativity and imagination:**
Importance of thinking up ideas and being creative, imagination as a desirable child quality.
2. **WVS questions examining independence from authority:**
Preference for private/government responsibility; independence as a desirable child quality; obedience as a desirable child quality; respect for authority viewed positively or negatively.
3. **WVS questions examining belief that hard work can lead to success:**
Hard work vs. luck as a driver of success; self-expression as a desirable child quality; preference for private vs. government ownership; tolerance for differences in income.
4. **WVS questions examining the role of altruism:**
Importance of acting for the good of society; tolerance/respect as a desirable child quality.

Finally, the analysis is complemented by a number of survey-based indicators collected specifically for the Inclusive Innovation Atlas. These build on three lines of argument commonly heard from practitioners and familiar in the academic discussion, falling into three general topic areas:

General work ethic and individual independence:

- Societal appreciation for engaging in individual hard work to improve one's fate, rather than accepting one's given living conditions.
- Societal appreciation for acting on one's own initiative rather than accepting established authorities' guidance.
- Societal appreciation for independent private initiative rather than taking action only once a government requests it.

Role of creativity and self-expression

- Societal appreciation for individual self-expression rather than adherence to established traditions.
- Societal appreciation for individual creativity and imagination rather than the reproduction of established knowledge.
- Openness on the part of business people to focusing on social impact rather than on profit and/or technology alone.

“Doing good” and inclusiveness

- Societal appreciation for altruism and “doing good” in society rather than the pursuit of individual profit.
- General societal commitment to improving socioeconomic inclusion and supporting the fight against poverty.
- Extent to which socioeconomic inclusion and fighting poverty are considered as tasks to which individuals – rather than the state – should contribute.

This information was collected through the dedicated expert survey, which was conducted primarily to inform the status quo analysis. Hence, assessments are available for all countries, and provide this sub-index with a robust grounding even in countries where no WVS has been conducted.

Absorptive capacity for innovation

Following the initial phase of inspiration and co-development with pilot users, inclusive innovators typically find it difficult to run their businesses alone, and thus need local partners. Hence, the literature suggests that the effectiveness of an inclusive entrepreneur’s activities will depend on the availability of local partners with basic education (Kroll and Gabriel, forthcoming). With an importance comparable to that of access to initial local finance, these partners are needed to enable and scale a polycentric approach to user-driven innovation (v. Hippel, 2005; Prahalad and Ramaswamy, 2010), and to enable reverse innovation (Bower and Christensen, 1995; Christensen et al., 2006; Zeschky et al., 2014; Winter and Govindarajan, 2015). Finally, the basic ability to comprehend and deploy technology can be crucial not only in developing and delivering the products or services that derive from inclusive innovation (Ray and Ray, 2010; Foster and Heeks, 2013; European Commission, 2016), but also in connecting local business ecosystems with global networks (Tiwari and Herstatt, 2012; Brem and Freitag, 2015). Likewise, research and education institutions can at times play a strong complementary role in enabling inclusive innovation (Brundenius et al., 2014; Grobbelaar et al., 2017).

With these considerations in mind, we selected indicators in the following three areas:

1. Indicators providing evidence of the presence of basic education:

Literacy rate, quality of education system, duration of primary education, enrollment ratio in primary education, share of school students reaching final grade.

Unlike standard innovation indices (which focus on tertiary education), this perspective focuses on primary education. It follows the argument that basic literacy, the ability to calculate, and a fundamental understanding of mechanical design, distance and geography can be fundamental in order to play the role of “local partner.”

2. Indicators providing evidence of access to finance:

Ease of access to loans, availability of venture capital.

While exploratory activities can be financed by family and friends, the actual realization of inclusive innovation in the form of products or services, and certainly any cross-regional scaling of such activities, requires external means. Hence, the national banking system’s readiness to provide credit or investment to individuals may determine whether a project goes ahead or not.

3. Indicators providing evidence of firm-level absorptive capacity:

Innovation capacity, FDI and technology transfer, firm-level technology absorption.

While not all inclusive innovations require technology, many do, at least to some extent. If a country has no companies with sufficient innovation capacity to provide that element of input, or which can at least absorb and process external technology and inspiration, inclusive innovation will likely be restricted to low-tech, localized solutions.

Robust institutions and governance

Recent case studies have revealed issues of good governance and institutions to be of central importance (European Commission, 2016; Kroll and Gabriel, forthcoming). Other studies have highlighted the exclusionary nature of the informal economy (Transparency International, 2017; Yadav, 2014). Where bureaucracy hampers all business, few innovative solutions will be developed and delivered. Where the economy is overly informal, new innovators will find it difficult to reach a point at which they can effectively scale their solutions. Where outright corruption and a dismissive attitude toward the public good prevail, few administrations will have an interest in triggering changes in the existing social situation, including those prompted by inclusive innovations (European Commission, 2016).

With these considerations in mind, we selected indicators in the following three areas:

1. Indicators providing evidence on bureaucratic rigidity and institutional reliability:

Ease of Doing Business Index; number of documents needed to import; number of days needed to obtain electricity; transparency of government policy-making; Strength of Legal Rights Index.

While some initial business-development steps can certainly be taken without express permission, all concrete production or coordination activities will at some stage have to be officially acknowledged, for example to enable broad-based sales and transportation. Without basic formal support, specific actions remain either impossible or illegal, and certain resources cannot be accessed.

2. Indicators providing evidence of challenges experienced in the informal economy:

Competition by unregistered firms, share of formally registered firms.

At the early stages of enterprise development, when inclusive innovators are still operating within an intimately known environment, informality may not matter, or may even be conducive to the activity. When it comes to scaling efforts beyond this initial ecosystem, however, the absence of accessible contact points and the initial lack of knowledge regarding other regions' informal business conventions will be a substantially delaying – if not prohibitive – factor.

3. Indicators providing evidence of outright corruption:

Tax evasion considered justifiable, bribery considered justifiable, share of firms reporting that tax officials expect gifts.

Corruption and a dismissive attitude toward the public good will tend to undermine public-sector readiness to permit or actively support inclusive innovation. For example, the concept of inclusive innovation may lack support within official or governmental circles, and relevant official actors may thus remain passive instead of engaging in the activities needed. In a more damaging scenario, people in positions of power might regard the impact of new solutions as a threat to established coalitions of interest, and actively obstruct them.

2 FINDINGS

2.1 Introduction

Based on the methodology outlined in a separate document, the Bertelsmann Stiftung's Inclusive Innovation Atlas describes Asian countries' current positioning with respect to inclusive innovation practices, an emerging field of economic opportunity.

Inclusive innovation aims to provide sustainable solutions to citizens excluded from access to goods and services traded in regular markets due to social, economic or environmental factors. Unlike traditional charitable approaches, activities in this field rely on private and public entrepreneurship to address societal challenges in the social, economic and environmental domains. Such activities may, but need not, be driven by altruistic motives alone. Rather, they seek to reconcile individual entrepreneurial ambitions with a societal mission.

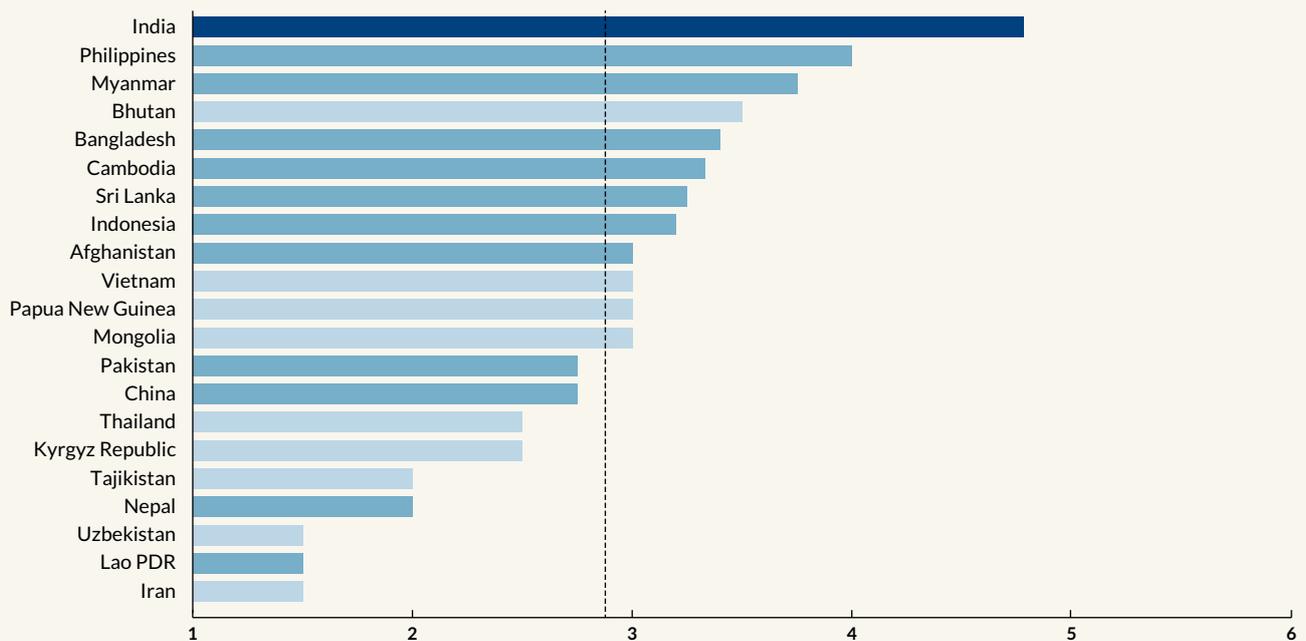
The Inclusive Innovation Atlas offers two important perspectives on the development of inclusive innovation practices. First, it provides evidence of existing activities, cutting through the veil of political rhetoric to look at the genuine impact on socioeconomic development. Second, it provides an evidence-based assessment of countries' specific potential to take advantage of inclusive innovation opportunities in the future. Irrespective of the current level of activities, socioeconomic conditions inevitably vary from country to country; these differences can in turn be analyzed with a view to identifying advantages or disadvantages for future inclusive innovation initiatives.

2.2 Asian countries: between challenges and capacities

2.2.1 Evidence of existing activities

As Figure 1 illustrates, the Inclusive Innovation Atlas confirms prevailing assumptions that India, the Philippines and Indonesia are countries with an above-average level of inclusive innovation activity. Among these, India stands out as the country with the highest level of activities that can be deemed “inclusive.” Furthermore, the analysis reveals a strong presence of such activities in Myanmar, Bhutan, Bangladesh, Cambodia and Sri Lanka. Interestingly, notable levels of activity are also reported in several countries that have not previously been closely associated with this topic, including Afghanistan, Vietnam, Papua New Guinea and Mongolia.

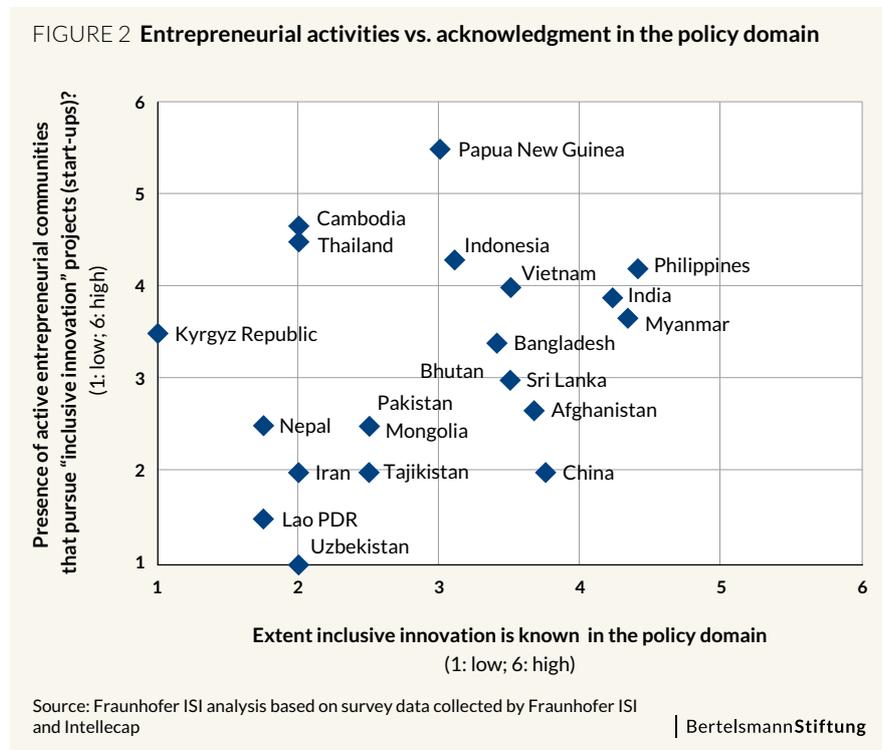
FIGURE 1 Overall level of inclusive innovation activities, ranging from 1 (very low) to 6 (very high)



Source: Fraunhofer ISI analysis based on survey data collected by Fraunhofer ISI and Intellectap

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These additional findings can likely be explained by the fact that political rhetoric on the topic of inclusive innovation is not always related to the intensity of actual activity (Figure 2). In India and the Philippines, the high level of political attention matches the substantial level of entrepreneurial activities. At the other of the scale, a similar consonance is found in countries such as Laos, Iran and Uzbekistan, where limited entrepreneurial activities are matched by a low level of interest at the policy level. At the same time, some countries display high levels of inclusive innovation despite the absence of significant – or any – political attention. Starting with Papua New Guinea and Indonesia, this group also includes Cambodia, Thailand and the Kyrgyz Republic. Conversely, China’s leadership has recently attributed increased importance to inclusiveness, while actual activities in this domain remain underdeveloped, or have at least escaped the Atlas’ survey.



2.2.2 Evidence-based assessment of future potential

For inclusive entrepreneurship to thrive and succeed, countries have to fulfill two main criteria (Figure 3). On the one hand, they have to display a certain level of social, economic and environmental challenges that trigger responses in the form of entrepreneurial action. These can be subsumed under the heading of “local challenges.” On the other hand, inclusive innovation depends on a number of factors that permit and enable entrepreneurial responses to be carried out. These can be subsumed under the heading of “capacity factors.” As outlined in more detail in the Conceptual Report, local challenges that could trigger inclusive innovation include insufficiently developed infrastructures, an overall lack of socioeconomic development, and disparities that exclude certain parts of the population even in otherwise wealthy countries. Basic capacity factors include cultural attitudes

that favor or inhibit inclusive endeavors, the absorptive capacity of local industry with regard to alternative solutions that quite often involve knowledge transfer, and the quality of the governance and institutions that affect all entrepreneurial activity, including inclusive entrepreneurship.

FIGURE 3 Approach pursued by the Inclusive Innovation Atlas

CHALLENGES			CAPACITIES		
					
POOR INFRASTRUCTURE / HARSH ENVIRONMENT	LOW LEVEL OF SOCIOECONOMIC DEVELOPMENT	PREVALENCE OF VULNERABILITY AND DISPARITIES	CULTURAL / SOCIETAL PREFERENCE FOR CHANGE	ABSORPTIVE CAPACITY FOR INNOVATION	ROBUSTNESS OF INSTITUTION AND GOVERNANCE
Indicator Challenge.1.x	Indicator Challenge.2.x	Indicator Challenge.3.x	Indicator Capacities.1.x	Indicator Capacities.2.x	Indicator Capacities.3.x
Indicator Challenge.1.y	Indicator Challenge.2.y	Indicator Challenge.3.y	Indicator Capacities.1.y	Indicator Capacities.2.y	Indicator Capacities.3.y

Source: Concept by Fraunhofer ISI

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As documented in detail in the conceptual report, each of these six sub-dimensions in turn comprises an aggregation of specific indicators drawn from a diversity of well recognized sources. These sources include the World Bank Group, the United Nations, the World Economic Forum, the World Values Survey, the International Monetary Fund, Transparency International and the Global Footprint Network. The “preference for change” indicator additionally reflects the findings from a broad-based survey of experts conducted between April and July 2018. In the course of this survey, 77 responses were collected for 21 countries, or an average of 3.7 answers per country. Overall, the Atlas’ two overarching perspectives aggregate a total of 72 individual indicators whose selection was based on a meticulous consideration of their conceptual substance, and on additional statistical analyses confirming that they were indeed relevant explanatory components for each of the six sub-dimensions.

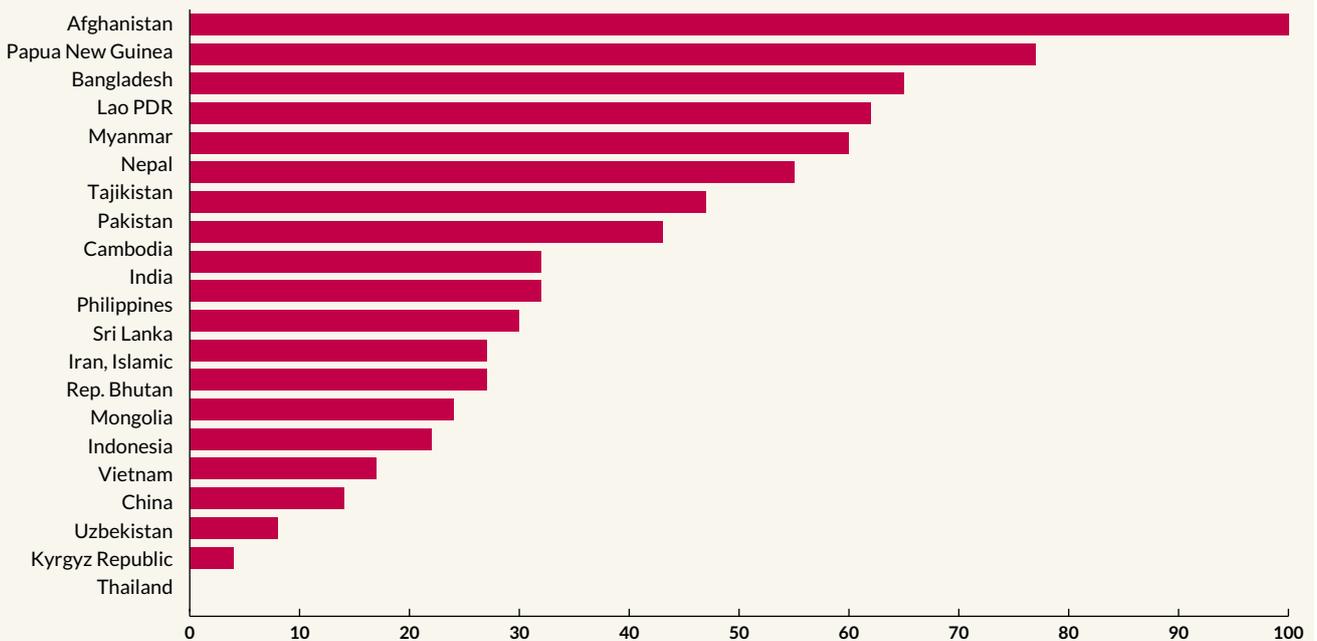
In the following, this summary will report key findings from the Inclusive Innovation Atlas, providing insight into the study’s overall results as well as more detailed information.

2.2.3 Relevant local challenges

Overall, local challenges are most severe in Afghanistan, Papua New Guinea, Bangladesh and Laos, while they are mildest in Vietnam, China, Uzbekistan, the Kyrgyz Republic and Thailand. Quite clearly, the findings indicate that the overall urgency of societal issues and thus, implicitly, the impetus to engage in entrepreneurial responses, varies significantly across Asian countries (Figure 4).

Remarkably, most of the countries known internationally as hotspots of inclusive innovation (India, Indonesia, the Philippines) do not display an above-average severity of challenges, at least within the analyzed group of countries – which, however, excludes Asia’s most developed nations. However, countries such as China and Thailand distinguish themselves from most of the others by the relatively mild intensity of their local societal challenges.

FIGURE 4 Overall severity of local challenges, according to the Inclusive Innovation Atlas



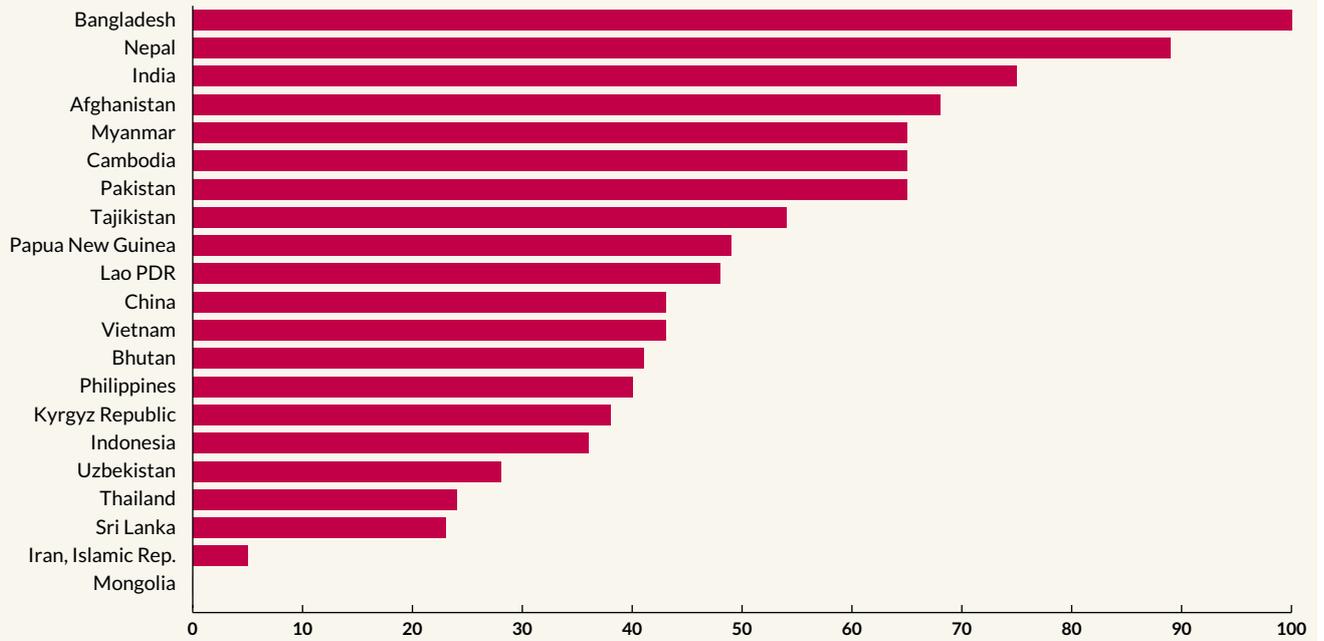
Source: Analysis by Fraunhofer ISI

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When examining the individual components of the “local challenges” dimension (figures 5 to 7), it is clear that Bangladesh, Nepal, India, Afghanistan and Myanmar currently face the greatest hurdles with respect to environmental conditions and infrastructure. With regard to overall socioeconomic development, the greatest challenges are evident in Afghanistan, Laos, Tajikistan, Bangladesh and Papua New Guinea. In the area of disparities and specific-group vulnerabilities, Afghanistan, Papua New Guinea, Laos, Nepal and Myanmar show the greatest challenges. While the group of countries facing the greatest difficulties in this area is thus to a certain extent consistent across sub-dimensions, differences in emphasis are clearly detectable. Moreover, the group of countries in which challenges are

comparatively most mild displays even more limited overlaps. This indicates that it would be valuable to analyze the three aspects separately before aggregating them into a single dimension.

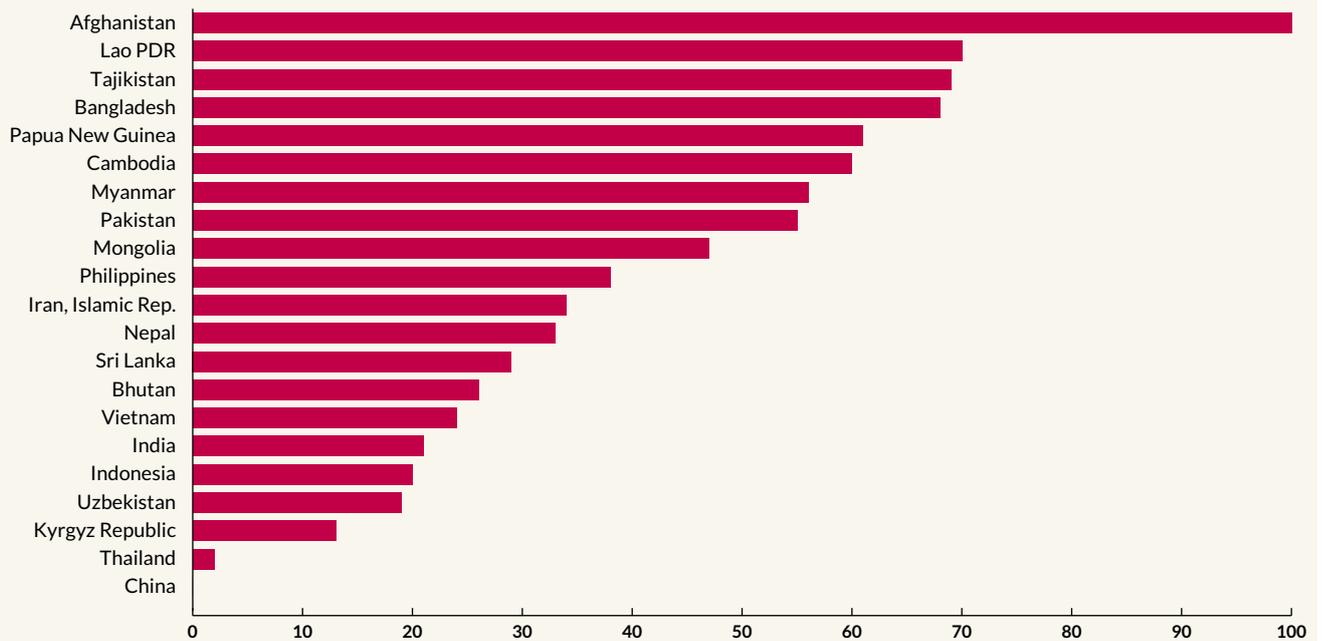
FIGURE 5 Challenges I – Poor infrastructure and harsh environment



Source: Analysis by Fraunhofer ISI

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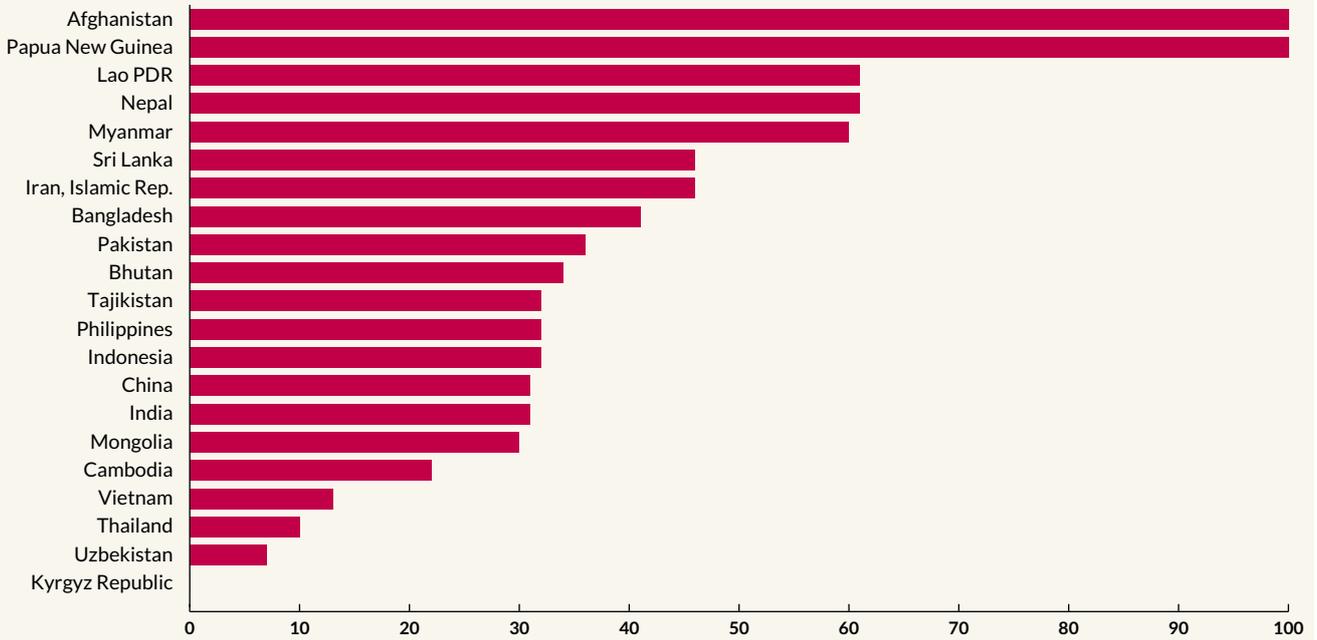
FIGURE 6 Challenges II – Low levels of socioeconomic development



Source: Analysis by Fraunhofer ISI

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FIGURE 7 Challenges III – Vulnerability and disparities



Source: Analysis by Fraunhofer ISI

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2.2.4 Capacity factors enabling entrepreneurial responses

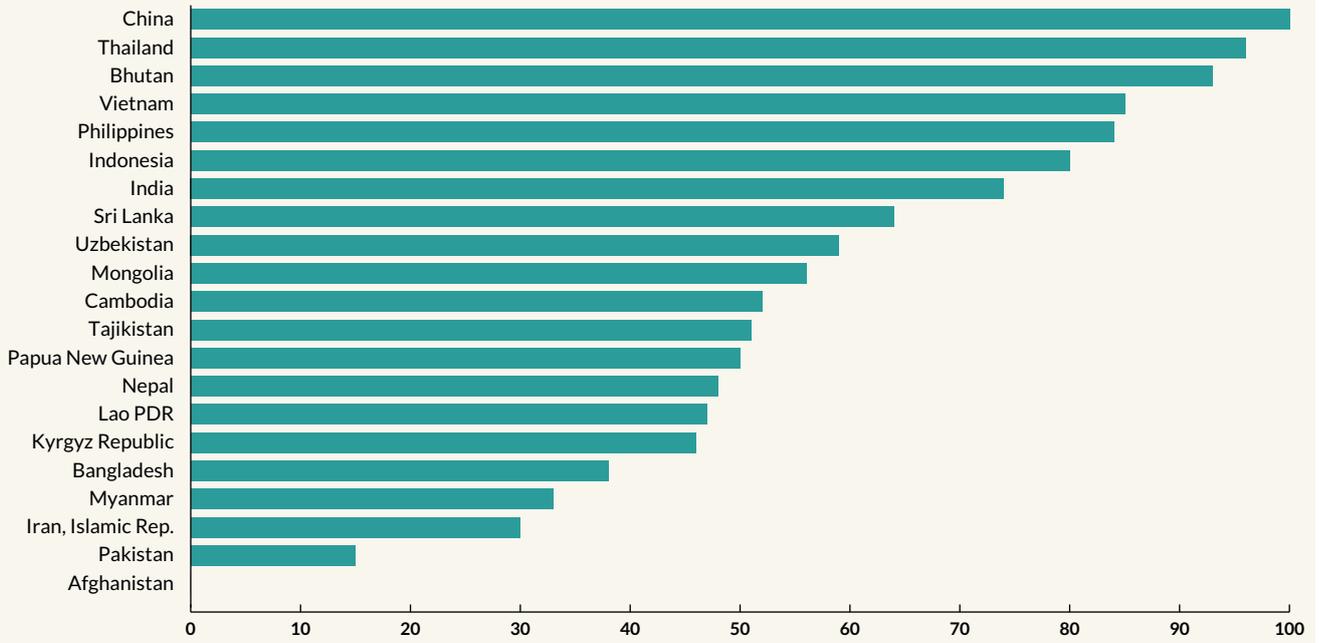
Overall, capacity levels are highest in China, Thailand, Bhutan, Vietnam and the Philippines, and are lowest in Bangladesh, Myanmar, Iran, Pakistan and Afghanistan. Quite clearly, the findings indicate that the overall capacity to permit, enable and appreciate entrepreneurial responses to societal challenges differs strongly across Asian countries (Figure 8).

Most of the countries known internationally as hotspots of inclusive innovation indeed display comparatively high capacity values. These include India, Indonesia and the Philippines, which collectively trail China, Thailand, Bhutan and Vietnam, countries with notably less severe societal challenges. Conversely, several countries in which severe societal challenges might in theory provide substantial impetus to engage in entrepreneurial responses display very low levels of capacity; this means that inclusive innovation activities there are likely to face greater practical obstacles, both with regard to enterprise creation and ongoing operations. Examples here include Afghanistan, Pakistan, Iran, Bangladesh and Myanmar.

An examination of the individual sub-components of the capacity dimension (figures 9 to 11), indicates that the general culture is considered most conducive to inclusive innovation in Bhutan, Vietnam, Cambodia, the Philippines and Mongolia. However, while cultural factors are thus regarded as being reasonably supportive in the Philippines, other nations closely associated with inclusive innovation, including India and Indonesia, still face notable obstacles in this area. The level of absorptive capacity is highest in China, Indonesia, Thailand, India and

the Philippines. Finally, governance practices and institutions are considered to be most reliable in Bhutan, Thailand, Uzbekistan and China.

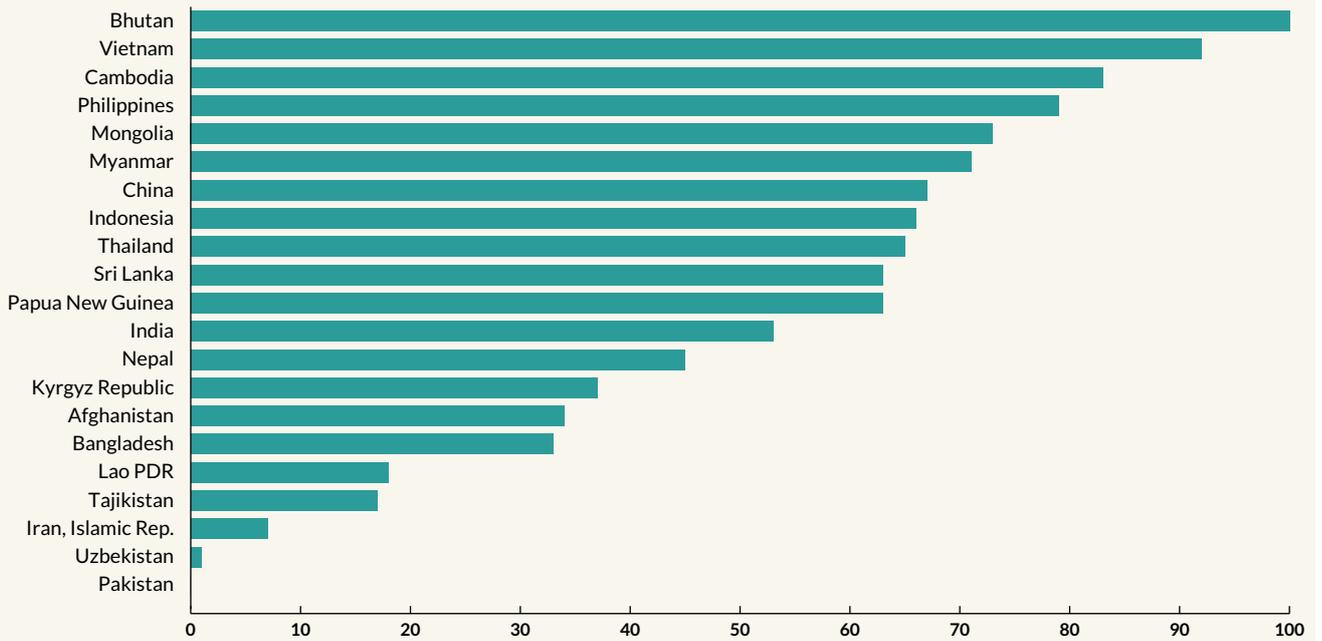
FIGURE 8 Overall level of relevant capacity, according to the Inclusive Innovation Atlas



Source: Analysis by Fraunhofer ISI

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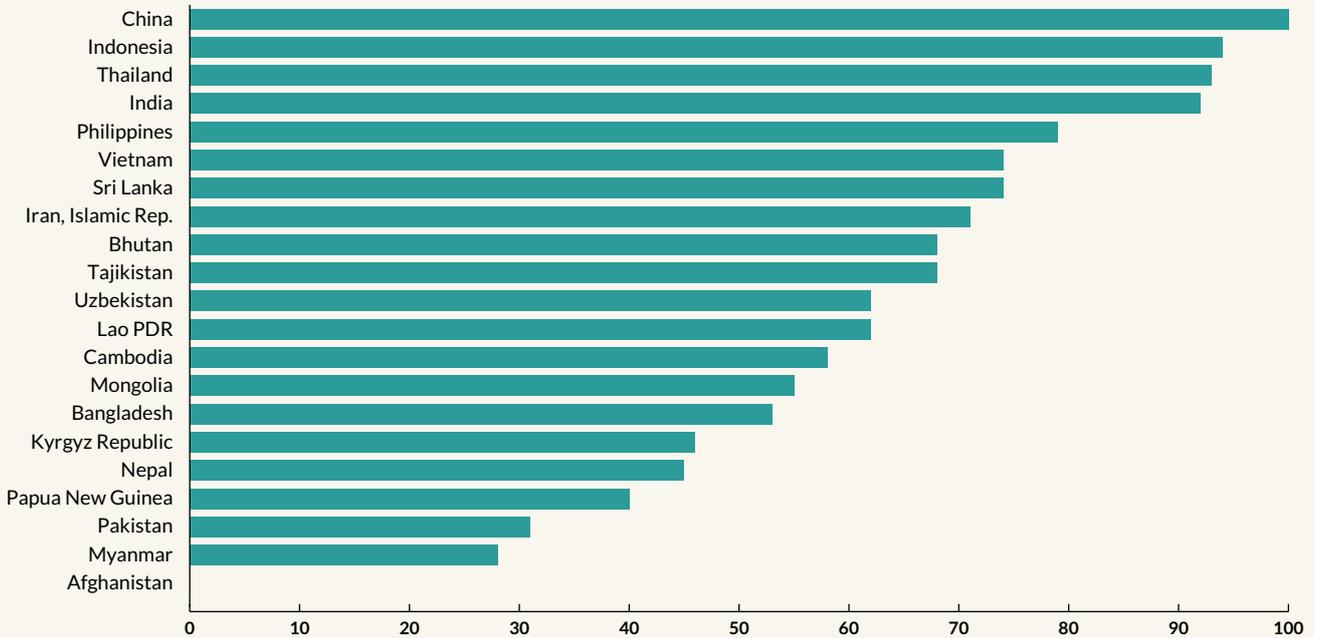
FIGURE 9 Capacity I – Preference for change



Source: Analysis by Fraunhofer ISI

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FIGURE 10 Capacity II – Absorptive capacity for innovation



Source: Analysis by Fraunhofer ISI

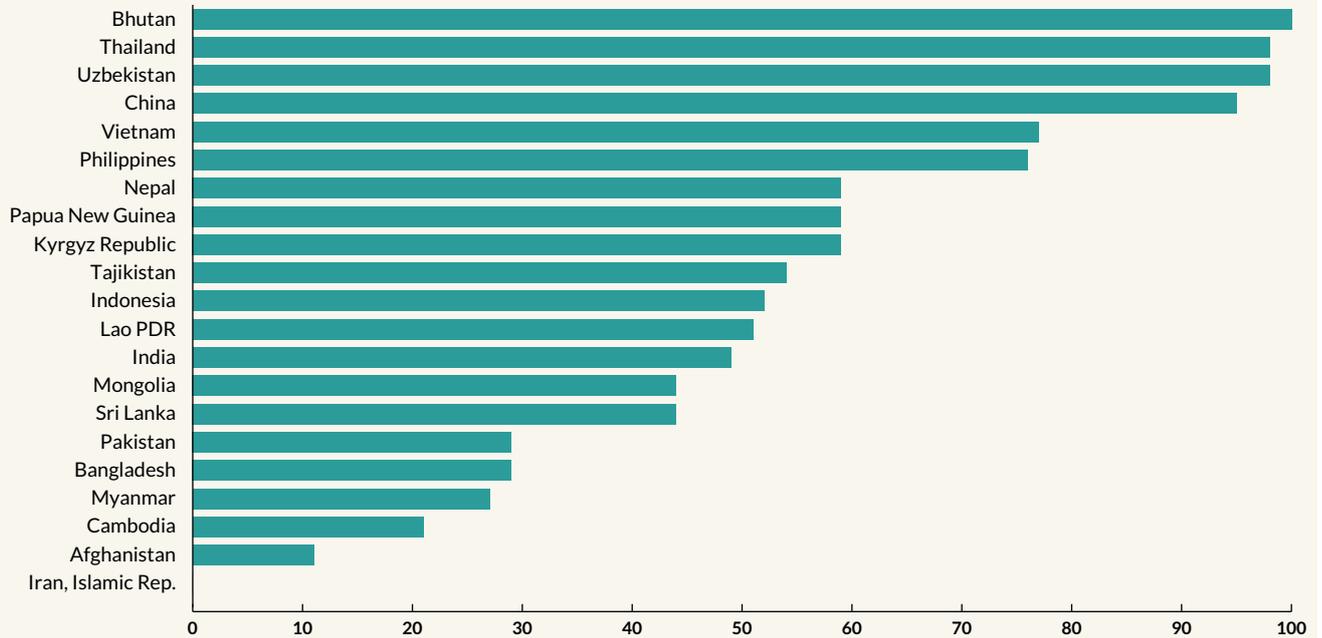
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2.2.5 Overall findings

General speaking, the Inclusive Innovation Atlas identifies **three main clusters of countries** grouped on the basis of their future potential for inclusive innovation activities (Figure 12). Some countries remain outside of these clusters because their relatively mild local challenges or low capacity levels, or both, make them unfavorable environments for inclusive innovation.

The first such cluster is a group of developing countries all showing comparatively significant challenges combined with capacity levels high enough that they are no longer prohibitive. This group of countries can be referred to as **environments with challenge-driven opportunities**, and includes Bangladesh, Laos, Myanmar, Papua New Guinea, Nepal, Tajikistan and Cambodia. The second cluster encompasses a number of developing countries with less severe but still very real challenges, along with moderately higher capacity levels. This group of countries can be referred to as **natural environments for inclusive innovation**, and includes India, Indonesia, the Philippines, Sri Lanka and Mongolia. The third cluster comprises countries with above-average levels of capacity and challenges still significant enough to provide entrepreneurial motivation. This group of countries can be referred to as **environments with capacity-driven opportunities**, and includes Bhutan, Vietnam, China and Thailand. Arguably, Indonesia and the Philippines could also be considered part of this category.

FIGURE 11 Capacity III – Robust institutions and governance



Source: Analysis by Fraunhofer ISI

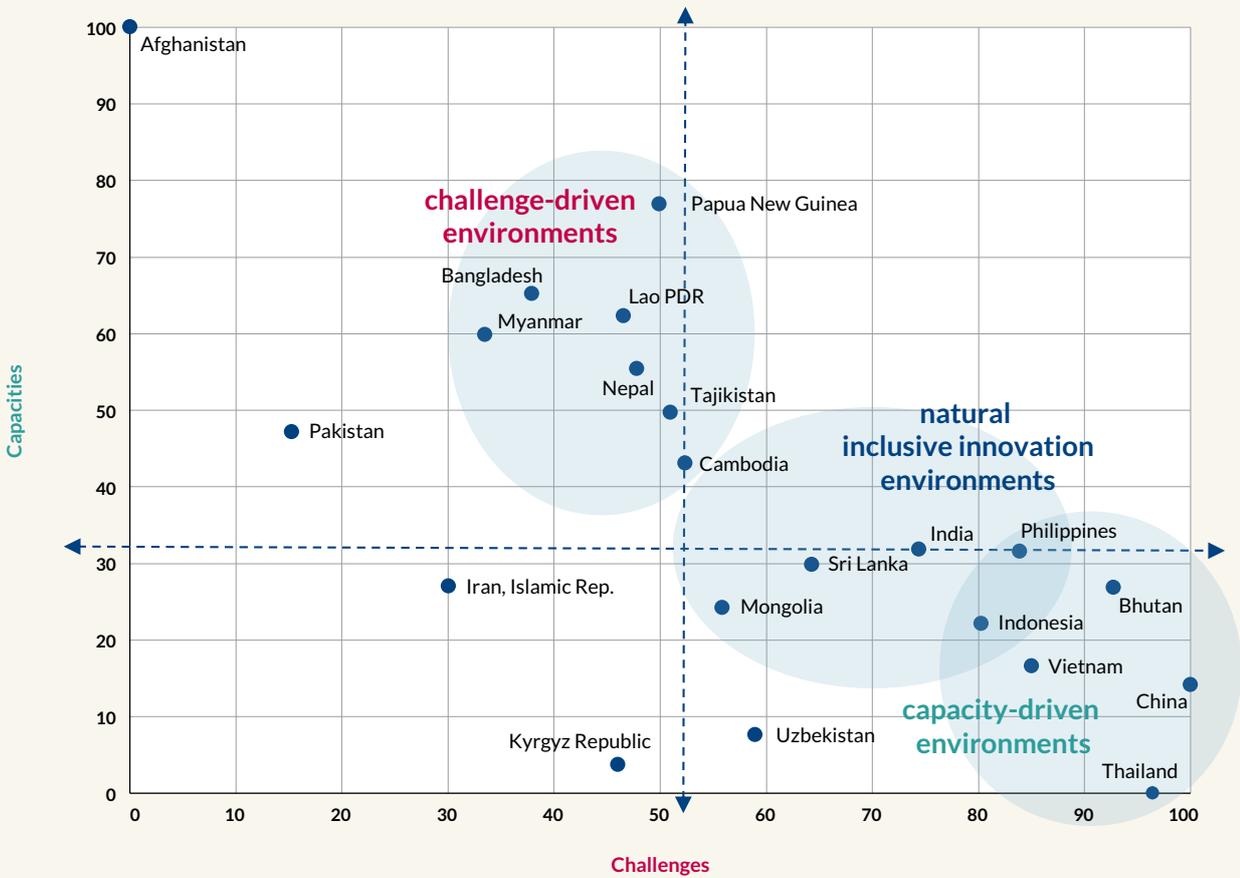
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2.2.6 Selected country profiles

The Inclusive Innovation Atlas additionally reveals sometimes-significant differences between individual countries' profiles, even within these clusters of similarity. This is particularly true of the countries showing challenge-driven opportunities, among which the specific patterns of challenge differ markedly (Figure 13). For example, Bangladesh and Nepal face great challenges deriving from their harsh environmental conditions and poor infrastructures, whereas Papua New Guinea is most strongly affected by social disparities and the vulnerable living conditions experienced by certain segments of the population. With the exception of Nepal, each of the countries in this group shows equally poor overall socioeconomic development levels. While all show low-quality institutions and governance, the degree of potential generated by the other two capacity domains differs. Papua New Guinea, Myanmar and Cambodia benefit from a favorable cultural climate, while basic absorptive capacity is good in Tajikistan, Laos, Cambodia and Bangladesh. Given this context, the high actual level of entrepreneurship in Cambodia (see figures 1 and 2) is not surprising. To a certain extent, the same applies to the group of natural environments for inclusive innovation, which here includes Indonesia, India, Sri Lanka, Mongolia and the Philippines. Here, the overall severity of local challenges is lower, with greater similarity between the countries; however, the Atlas did identify specific differences (Figure 14). Most obviously, India faces relatively severe challenges related to environmental conditions and infrastructure. Sri Lanka shows comparatively great local challenges deriving from disparities and population vulnerabilities, while overall levels of development produce relatively severe challenges in Mongolia and the Philippines. Finally, the cluster of environments offering capacity-driven opportuni-

ties contains countries with remarkably similar profiles (Figure 15). Among the differences in rankings within the various capacity sub-dimensions, only those pertaining to cultural preferences for change are noteworthy. In this regard, Bhutan, Vietnam and the Philippines fare better than China, Indonesia and Thailand. With a view to challenges, the most notable differences are between Thailand and the rest of the group.

FIGURE 12 Country clusters defined by opportunities for inclusive innovation



Source: Analysis by Fraunhofer ISI

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FIGURE 13 Detailed profiles of countries offering challenge-driven opportunities

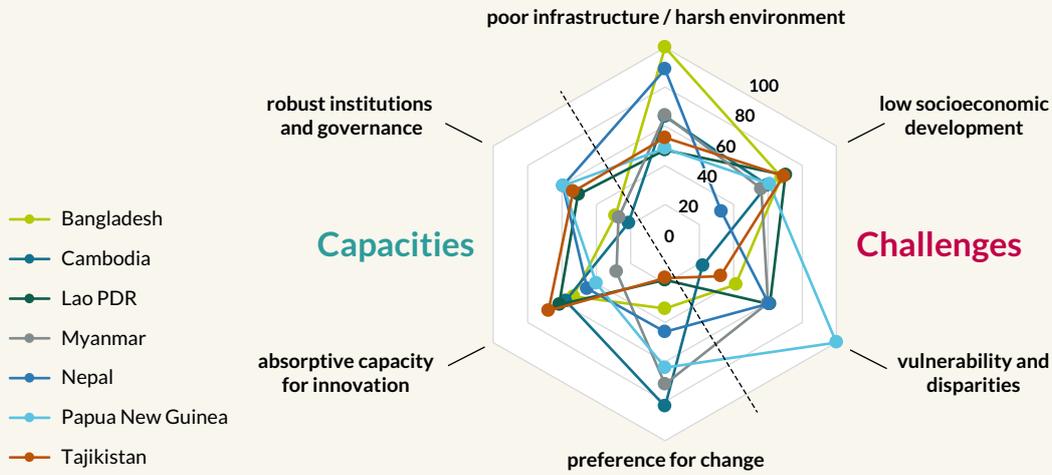


FIGURE 14 Detailed profiles of countries that are natural environments for inclusive innovation

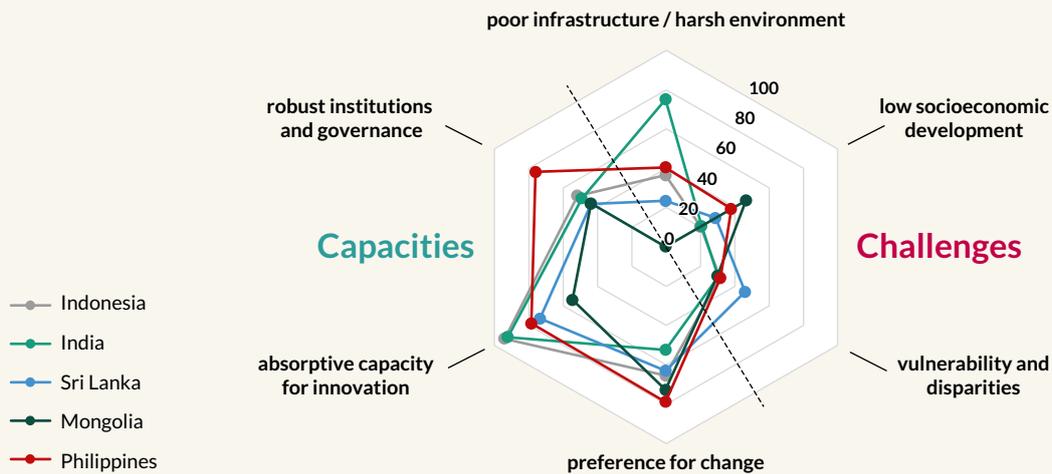
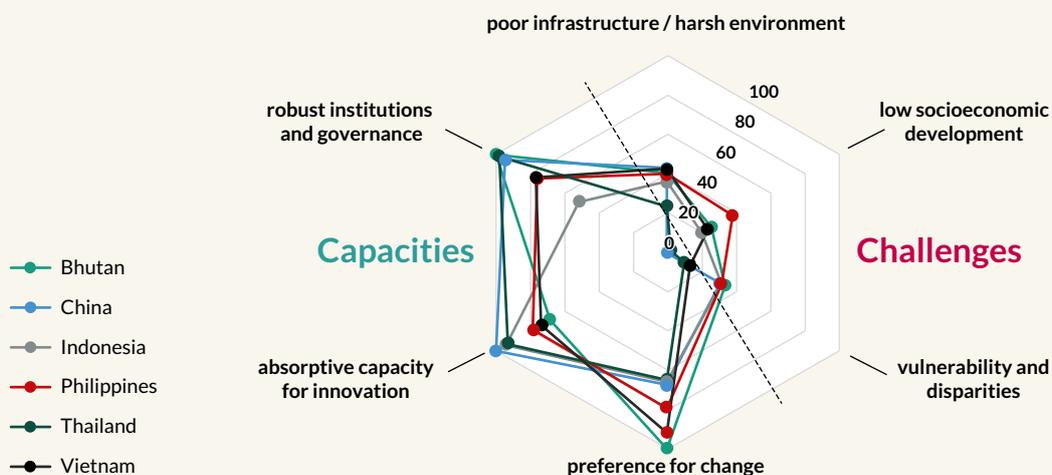


FIGURE 15 Detailed profiles of countries offering capacity-driven opportunities



Source: Analysis by Fraunhofer ISI

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ANNEX: METHODOLOGY

1 Introduction

A key challenge in measuring relevant factors in inclusive innovation lies in the fact that there are practically no suitable secondary data to measure the phenomenon of inclusive innovation as such, while most qualitative evidence remains partial and case-specific. While some available indices tailored to measuring human development in general or progress on societal development goals cover adjacent issues, they do not make it possible to address inclusive innovation specifically. For the time being, many studies point to the potential and promise of inclusive innovation, despite the fact that it has yet to assume a substantial role in the economies of many countries. It is therefore important to differentiate between what already exists and what could potentially be. Furthermore, some countries may have leveraged the potential of inclusive innovation to such a degree that – thanks to that very effectiveness – they are now gradually moving beyond a stage where it is most needed.

Furthermore, innovations with an inclusive effect are commonplace in many countries. However, they are not necessarily always actively promoted or even perceived as such in the discourse of governments, corporates and entrepreneurs. Depending on how a country's overall political and societal discourse is framed, inclusive innovation activities can, in some contexts, be cherished and championed while in others they might be ignored or frowned upon – irrespective of their actual extent and momentum.

Against this background, the **Inclusive Innovation Atlas** measures inclusive innovation from two main perspectives:

First, it aims to provide differentiated evidence of **potentials for inclusive innovation**. Irrespective of whether there are relevant activities currently underway, countries display different levels of local challenges and capacity factors for inclusive innovation that can to a large extent be identified through a targeted analysis of available secondary data. Thus, different types of socioeconomic environments with distinct leverage points for inclusive innovators can be distinguished.

The methodology used to collect and process data regarding potentials is documented in the “Findings” section.

Second, the **Inclusive Innovation Atlas** aims to provide evidence of the **current reach and recognition of activities** by cutting through the veil of political discourse and different national mindsets regarding socioeconomic development. This requires more than an examination of publicly available documents and press clippings, and involves surveying practitioners and experts using a standardized, yet sufficiently specific questionnaire.

The methodology used to collect and process data regarding the reach and recognition of activities is documented in the following.

2 Measuring potentials for inclusive innovation (based on available statistical and survey data)

The concept described in the following seeks to measure potentials for inclusive innovation in Asian countries by determining, on the one hand, whether there are challenges triggering and driving the conception of such solutions and, on the other, a capacity to realize them.

We have therefore created an index of potential that positions countries according to their relative affinity for inclusive innovation as reflected in two basic dimensions:

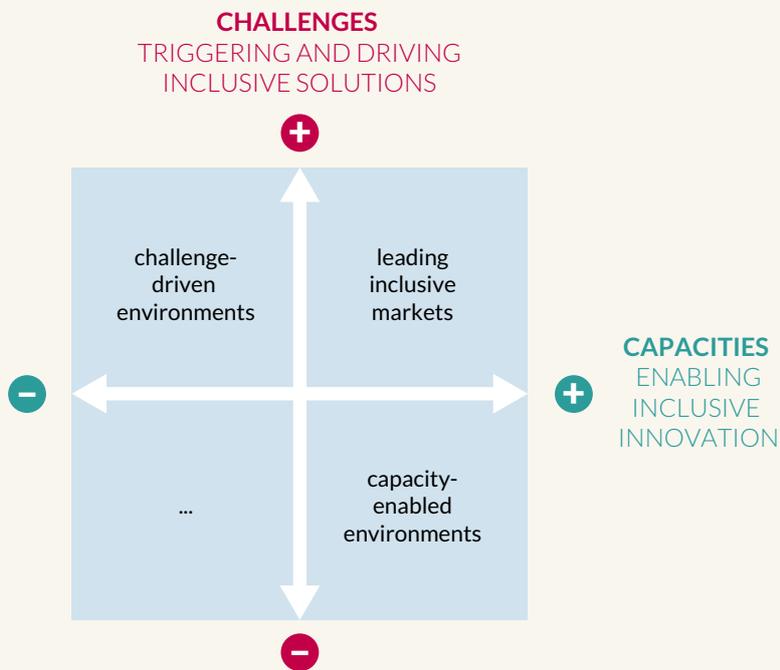
1. Relevant **challenges triggering inclusive innovation**, that is, national characteristics that determine a country's need for inclusive innovation.
2. The level of **capacity factors enabling inclusive innovation**, that is, factors determining the likelihood that inclusive innovation will materialize.

These two dimensions structure the form of the Inclusive Innovation Atlas, which does not consist of one individual index, but a two-dimensional matrix, as illustrated in Figure 1.

Moreover, each of the two dimensions is comprised of three sub-dimensions which are, in turn, comprised of individual indicators that are grouped by different "perspectives."

Details regarding the conceptual foundations of how these two dimensions as well as their sub-components were selected is provided in the Conceptual Report. In this section, they are taken as a premise.

FIGURE 1 The two dimensions of the Atlas



Source: Compilation by Fraunhofer ISI

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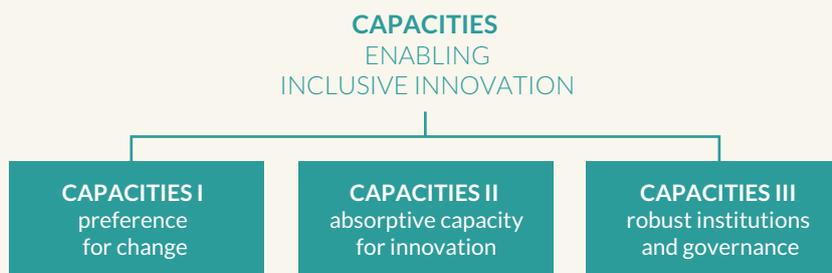
FIGURE 2 Sub-dimensions of the challenge dimension



Source: Conceptual approach by Fraunhofer ISI

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FIGURE 3 Sub-dimensions of the capacity dimension



Source: Conceptual approach by Fraunhofer ISI

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2.1 Toward a composite indicator

To determine the relevant influencing factors among all possible indicators, a step-by-step methodology was applied. It starts with a concept-driven, manual pre-selection of potential indicators. In order to create a final parsimonious model, however, it is necessary to eliminate redundant or irrelevant indicators (i.e., those that do not contribute a significant share of additional information when they are added to the original set of indicators). Consequently, several methodological steps were taken to select the most relevant indicators:

- I. A concept-driven, manual pre-selection
- II. Data collection and standardization
- III. Consolidation based on the availability of data (across time and space)
- IV. Consolidation based on correlations
- V. Consolidation based on multivariate regression models

These methodological steps were discussed during workshops with different experts from Europe, India and the World Bank, and will be explained in more detail below.

2.1.1 Concept-driven, manual pre-selection

This aspect of the selection process is elaborated in the Conceptual Report and therefore shall not be repeated in detail here.

Nonetheless, it is important to emphasize that the selection of indicators for the Inclusive Innovation Atlas is – at its foundations – concept-driven and directly derived from the literature on inclusive innovation. Indeed, some later elements of the technical selection (e.g., regression modeling) draw on this conceptual foundation.

As a guiding principle, each indicator considered for inclusion in the Atlas bore a clear conceptual foundation, and no indicator was excluded without explicit consideration of whether omitting it would remain consistent with the overall conceptual framework and could be justified in this framework's terms.

Nonetheless, there may be valid methodological reasons for dropping what initially appeared to be a promising indicator from a conceptual perspective. In some cases this involved indicators that did not cover essential countries, that were duplicates of already considered indicators or, in other cases, proved unfit for empirical confirmation by statistical means. The following sections of this section on methodology will elaborate on these issues in more detail.

2.1.2 Data collection and standardization

After the initial selection of more than 100 variables, data collection was carried out. Indicators from the following sources were collected:¹

¹ A detailed list of the final indicators including their exact sources is provided below.

- The World Bank: World Development Indicators Database and further sources
- The United Nations: Millennium Development Goals Indicators Database
- The World Economic Forum: Global Competitiveness Index Indicators
- World Values Survey: Wave 6 (2010–2014), complemented by longitudinal data where applicable
- International Monetary Fund: Structural Export Indicators
- Transparency International
- Global Footprint Network
- Yale University (Environmental Performance Index)
- An original expert survey conducted by Fraunhofer ISI (see Annex)

To fill some gaps and enable cross-checks over time for selected variables, the complete array of potentially relevant data was collected for all Asian countries from 2010 to 2016, wherever possible. This resulted in an unbalanced country-level panel dataset for further analyses. The countries that are included in the sample are listed in Table 1.

TABLE 1 List of countries surveyed

COUNTRY CODE	COUNTRY	COUNTRY CODE	COUNTRY
AF	Afghanistan	VN	Vietnam
PG	Papua New Guinea	MN	Mongolia
MM	Myanmar	IR	Iran, Islamic Rep.
LA	Lao PDR	UZ	Uzbekistan
BD	Bangladesh	KG	Kyrgyz Republic
NP	Nepal	TH	Thailand
PK	Pakistan	MY	Malaysia
IN	India	BN	Brunei Darussalam
BT	Bhutan	SC	Seychelles
KH	Cambodia	KZ	Kazakhstan
PH	Philippines	KR	Korea, Rep.
LK	Sri Lanka	JP	Japan
TJ	Tajikistan	SG	Singapore
ID	Indonesia	HK	Hong Kong SAR, China
CN	China		

Source: Compilation by Fraunhofer ISI

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After the indicators were collected, we first had to adjust their direction to make sure that they indeed measure challenges or the capacity for inclusive innovations (rather than the inverse). The variable “Quality of overall infrastructure, 1–7 (best),” for example, was reversed as it is supposed to measure the challenges in a country regarding infrastructure-related issues, implying that, after the reversal, a value of 1 represents the highest quality of overall infrastructure, while a value of 7 stands for the lowest quality. In a second step, we used the existing data from earlier and subsequent years to fill the gaps in the data. Since we cannot assume constant growth rates and because we use indicators measuring attitudes, where

future trends cannot be foreseen, we did not apply growth rates but took the value from the previous or subsequent years (if available) to fill some of the gaps in the data. Third, since they are measured on different scales and in different units, the indicators had to be standardized. There are several transformation procedures that have been used in the past. One of the standard procedures is the z-standardization or z-transformation, which has been applied here. It transforms each variable so that it has a mean of 0 and a standard deviation of 1, that is, the differences between the observed values are preserved while they are now comparable across the indicators. This is a necessary precondition for the creation of a composite indicator.

2.1.3 Consolidation of data

Data availability

As a first step toward parsimonious modeling, the data availability of all indicators was analyzed across countries and over time (see Table 2).

TABLE 2 Analysis of missing data

INDICATOR	CN	ID	IN	IR	JP	KH
Arable land (hectares per person)	5	5	5	5	5	5
Arable land (% of land area)	5	5	5	5	5	5
Average precipitation in depth (mm per year)	2	2	2	2	2	2
Access to electricity, rural (% of rural population)	2	2	2	2	2	2
Access to non-solid fuel, rural (% of rural population)	2	2	2	2	2	2
Electric power consumption (kWh per capita)	4	4	4	4	4	4
Droughts, floods, extreme temperatures (% of population)	0	0	0	0	0	0
Automated teller machines (ATMs) (per 100,000 adults)	6	6	6	6	6	6
Ease of doing business index	2	2	2	2	2	2
Net ODA as percentage of OECD/DAC donors GNI	0	0	0	0	5	0

Note: Green = complete availability, red = no data available.

Source: Compilation by Fraunhofer ISI

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An indicator that is available across all seven years from 2010 to 2016 is represented by a “7” in the table, one for which no information is available with a “0.” Indicators without any availability for all countries were excluded from the analyses, (e.g., “Droughts, floods, extreme temperatures”). Indicators that were available only for a few countries, (e.g., “Net ODA as percentage of OECD/DAC donors GNI”) were also excluded to avoid biased results. For further variables with a low number of cases, manual checks were performed to pick only those variables where information was available for recent years. As a rule of thumb, an N below one-third of total observations led to a further manual check – with regard to country coverage – for exclusion. Having checked data availability and dropped the variables for which no information was available, we used existing data from earlier and subsequent years to fill the gaps in the data (as described above).

Correlation and factor analyses

In order to remove redundant indicators, the pairwise bivariate correlations of the indicators within the respective sub-index were calculated. The correlation analysis allowed us to identify indicators that measure the same (latent) construct and are thus redundant. In other words, it is sufficient and necessary to include only one of the indicators, as including both would implicitly give the latent construct a higher weight within the sub-index, which is not what we aimed for. As a rule of thumb, all indicators whose correlation exceeded the value of 0.8 were tested in more detail regarding item-specific relevance and data availability. If there was no theoretical reason to prefer one indicator over the other, the indicator with the lower coverage was discarded. The other indicator remained within the sub-index.

TABLE 3 Correlation matrix for sub-dimension “Vulnerability and disparities”

INDICATOR	(1)	(2)	(3)	(7)	(8)	(9)	(10)
(1) Gini index (World Bank estimate)	1						
(2) Poorest quintile's share in national income	0.930*	1					
(3) Income share held by lowest 10%	0.886*	0.942*	1				
(4) Income share held by lowest 20%	0.952*	0.968*	0.979*				
(5) Youth unemployment rate, aged 15-24	-0.113*	0,002	0,045				
(6) Employment-to-population ratio	-0.125*	-0,020	0,001				
(7) Slum population as percentage of urban	-0.193*	-0.297*	-0.206*	1			
(8) Vulnerable employment, total (% of total)	0.373*	0.213*	0.121*	0.674*	1		
(9) Population using solid fuels, percentage	0.274*	0,059	0,030	0.741*	0.854*	1	
(10) Employment in agriculture (% of total)	0.234*	0,011	-0,054	0.565*	0.926*	0.843*	1
(11) 15-24 years old with comprehensive correct knowledge of HIV/AIDS, percentage	-0,034	-0.164*	-0,090	0,038	-0,071	0.134*	0,000
(12) Rural population (% of total population)	0.0964*	-0.087*	-0.145*	0.528*	0.657*	0.677*	0.755*

Significance level: *p<0.05. Note: Only a selection of correlations is shown.

Source: Compilation by Fraunhofer ISI

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Table 3 shows a correlation matrix for the sub-dimension “Vulnerability and disparities.” As we can see from the table, the variables (1), (2), (3) and (4) were highly interrelated, as were (8), (9) and (10). This led to the exclusion of variables (2) and (3), while variable (4) was kept due to expert opinions. In the case of variables (8), (9) and (10), variable (10) was dropped and (8) and (9) were kept, also on the basis of expert opinions.

In addition to the correlation analyses, we also calculated factor analyses for each of the sub-dimensions. These were used to double-check the correlation analyses and identify variables that measure a similar latent construct, that is, the ones scoring high on the same factor. This further helped to identify structures within the data and served as a further check for the transformation of the variables (see above).

Multivariate models

In a final selection step, we ran a series of multivariate regression models (OLS regressions with robust standard errors) to find out whether the selected variables had, *ceteris paribus*, a significant effect on a relevant outcome variable. With the help of those regressions, causal relationships between the relevant inputs and outputs of a sub-dimension could be identified. When a variable was significant, it was interpreted as being a relevant input indicator for explaining the respective outcome variables. Variables that did not have a significant influence on any of the chosen dependent variables (dVs) were considered redundant indicators and therefore excluded from further calculations.

Typically, some of the most specific sub-dimensions are composed of two to three analytical aspects, for which particularly pertinent or “representative” variables could be selected. Several models were tested in sequence for each sub-dimension. Indicators were required to demonstrate a significant impact in at least one of these models. When an aspect did not show any significant effect in one of the models, it was considered not to be relevant for further analyses.

The outcome variables per sub-dimension (or dependent variable) were chosen on conceptual grounds among the other indicators within the respective sub-dimension, as illustrated in Table 4. Naturally, it is hardly possible to identify one

TABLE 4 Justification of selection of dependent variables for multivariate models

Inclusive Innovation Atlas sub-dimension	Dependent variable selected	Justification
CHALLENGES		
Low socioeconomic development	Population below \$1.25 (PPP) per day Survey mean consumption or income per capita, bottom 40% of population (PPP)	Acknowledged absolute poverty indicator used by various international organizations Reflects whether a broad bottom-of-pyramid population exists in a country
Vulnerability and disparities	Gini index	Acknowledged aggregate disparity indicator used by various international organizations
Poor infrastructure / harsh environment	Quality of overall infrastructure Eco-Fallacy Index	Aggregate index, to which more specific infrastructure aspects should relate Aggregate index for environmental degradation, to which other aspects should relate
CAPACITIES		
Cultural preference for change	Independence as a child quality To think up new ideas and be creative To do something for the good of society	Indicators representative of core preconditions for an “inclusive innovation climate” - Openness to question status quo - Ability to think outside the box - Impetus to act out of a social motive
Absorptive capacity for innovation	Technology absorption (firm-level) Capacity for innovation	Reflects ability to adopt technology for a purpose Reflects ability to make own contributions
Robust institutions and governance	Ease of doing business index Legal rights index	Aggregate index including soft(er) factors Explicit reference to basic institutional framework

Source: Fraunhofer ISI final concept

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variable among all those selected for an analytical sub-dimension that can serve equally as a reference point for the rest – particularly since most sub-dimensions of the atlas integrate related, yet clearly distinct analytical aspects. Consequently, the indicator sets of most sub-dimensions were validated against more than one dependent variable.

Table 5 depicts the models for the sub-dimension “Environmental conditions & infrastructure” (the models for the other sub-dimensions are provided in the annex). The chosen outcome variables were the “Quality of overall infrastructure” and the “Biocapacity Index.” The models were calculated to find out whether the

TABLE 5 Multivariate models for sub-dimension “Poor infrastructure / harsh environment”

dV: QUALITY OF OVERALL INFRASTRUCTURE, 1-7 (BEST)	COEF.		S.E.
Arable land (% of land area)	-0.039		0.036
Improved water source, rural	0.048		0.064
Improved sanitation facilities	0.028		0.062
Fixed telephone subscr. (per 100 people)	0.575	***	0.056
ATMs (per 100,000 adults)	0.069		0.045
Biocapacity Index	-0.140	***	0.030
Environmental Risk Exposure	1112.841	**	432.236
Air Pollution	-0.030		0.023
Constant	-124.069	**	48.295
Time Dummies		YES	
Obs.		434	
F		72.42	
Prob > F		0.000	
R ²		0.5683	
dV: BIOCAPACITY INDEX	COEF.		S.E.
Arable land (% of land area)	-0.029		0.027
Quality of overall infrastructure, 1-7	-0.199	***	0.039
Improved water source, rural	-0.432	***	0.099
Improved sanitation facilities	-0.446	***	0.065
Fixed telephone subscr. (per 100 people)	-0.059		0.069
ATMs (per 100,000 adults)	0.337	***	0.090
Environmental Risk Exposure	5070.714	***	510.401
Air Pollution	0.079	**	0.030
Constant	-566.471	***	57.030
Time Dummies		YES	
OBS.		434	
F		14.97	
PROB > F		0.000	
R ²		0.4286	

Significance level: ***p<0.01, **p<0.05, *p<0.1. Note: Red = insignificant in both models, blue = insignificant in only one model.

Source: Fraunhofer ISI final concept

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indicators of the sub-index had a significant influence on at least one of these outcomes. It can be shown that only the indicator “Arable land (% of land area)” does not show any influence on the dVs. Consequently, the indicator was dropped and not used in further analyses. The indicators “ATMs (per 100,000 adults)” and “Fixed telephone subscriptions (per 100 people)” were insignificant in only one of the two models and were thus kept.

In summary, the presented method of selecting variables is based on a multi-step approach. Each indicator that was pre-selected on conceptual grounds was further tested to see if the inclusion of the given indicator leads to an increase in the explained variance within the specific sub-dimensions and in the overall dimensions of “challenges” and “capacities” that are relevant for inclusive innovation.

2.2 Final list of indicators and indicator description

The following indicators have been selected for inclusion in the Inclusive Innovation Atlas. In this section, we list the indicators and give a brief account of what they measure. We describe the indicators by sub-dimension.

TABLE 6A Final list of indicators – SUB-DIMENSION CHALLENGES I

DETAILED INDICATOR DESCRIPTION	SOURCE	REVERSED
Quality of overall infrastructure, scale of 1-7 (best)	World Economic Forum	yes
Improved water source, rural (% of rural population with access)	The World Bank	yes
Improved sanitation facilities (% of population with access)	The World Bank	yes
Fixed telephone subscriptions (per 100 people)	The World Bank	yes
Automated teller machines (ATMs) (per 100,000 adults)	The World Bank	yes
Biocapacity Index	Calculated based on data from the Global Footprint Network	yes
Environmental Risk Exposure	Yale University	no
Air Pollution – Average Exposure (population weighted, three-year average)	Yale University	no

Source: Fraunhofer ISI final concept

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TABLE 6B Final list of indicators – SUB-DIMENSION CHALLENGES II

DETAILED INDICATOR DESCRIPTION	SOURCE	REVERSED
Population below \$1.25 (PPP) per day, percentage	United Nations	no
Survey mean consumption or income per capita, bottom 40% of population (2011, PPP)	The World Bank	yes
Population undernourished, percentage	United Nations	no
Infant mortality rate (0-1 year) per 1,000 live births	United Nations	no
Cause of death, by injury (% of total)	The World Bank	no
Tuberculosis prevalence rate per 100,000 population (mid-point)	United Nations	no
Survey Question: Last 12 months: Gone without enough food, 1-4 (never)	World Values Survey	no
Export Diversification Index	International Monetary Fund	yes
Export Quality Index	International Monetary Fund	yes

Source: Fraunhofer ISI final concept

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TABLE 6C Final list of indicators – SUB-DIMENSION CHALLENGES III

DETAILED INDICATOR DESCRIPTION	SOURCE	REVERSED
Gini index, scale of 0-100 (perfect inequality)	The World Bank	no
Income share held by lowest 20%	The World Bank	yes
Youth unemployment rate, aged 15-24, both sexes	United Nations	no
Employment-to-population ratio, both sexes, percentage	United Nations	yes
Slum population as percentage of urban, percentage	United Nations	no
Vulnerable employment, total (% of total employment)	The World Bank	no
Population using solid fuels, percentage	United Nations	no

Source: Fraunhofer ISI final concept

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TABLE 6D Final list of indicators – SUB-DIMENSION CAPACITY I

DETAILED INDICATOR DESCRIPTION	SOURCE	REVERSED
Mobile cellular subscriptions (per 100 people)	The World Bank	no
Internet users (per 100 people)	The World Bank	no
International migrant stock (% of population)	The World Bank	no
Private vs. government ownership, scale of 1-10 (Govt. ownership should increase)	World Values Survey (Survey Question)	no
Private vs. government responsibility, scale of 1-10 (Govt. should take responsibility)	World Values Survey (Survey Question)	no
Important child qualities: tolerance and respect, scale of 0-1 (important)	World Values Survey (Survey Question)	no
Important child qualities: obedience, scale of 0-1 (important)	World Values Survey (Survey Question)	yes
Important child qualities: independence, scale of 0-1 (important)	World Values Survey (Survey Question)	no
Important child qualities: imagination, scale of 0-1 (important)	World Values Survey (Survey Question)	no
Important child qualities: self-expression, scale of 0-1 (important)	World Values Survey (Survey Question)	no
Greater respect for authority (is good or bad), scale of 1-3 (bad)	World Values Survey (Survey Question)	yes
Hard work vs. luck as a driver of success, scale of 1-10 (Hard work doesn't bring success)	World Values Survey (Survey Question)	no
Tolerance concerning income inequality, scale of 1-10 (Income differences are necessary)	World Values Survey (Survey Question)	no
Women in labor force, ratio to men	World Economic Forum	no
It is important to [a person like me] to think up new ideas and be creative, scale of 1-6 (not at all like me)	World Values Survey (Survey Question)	yes
It is important to [a person like me] to do something for the good of society, scale of 1-6 (not at all like me)	World Values Survey (Survey Question)	yes
Society appreciates individual hard work to improve one's fate, scale of 1-6 (1: accept one's fate; 6: change it)	Expert Survey Fraunhofer ISI	no
Society appreciates own initiative rather than following established authorities, scale of 1-6 (1: follow; 6: own initiative)	Expert Survey Fraunhofer ISI	no
Society appreciates independent private initiative rather than only acting on government request, scale of 1-6 (1: respond; 6: private initiative)	Expert Survey Fraunhofer ISI	no
Society appreciates individual self-expression rather than adherence to traditions, scale of 1-6 (1: follow; 6: self-expression)	Expert Survey Fraunhofer ISI	no
Society appreciates own creativity rather than the reproduction of established knowledge, scale of 1-6 (1: reproduction; 6: creativity)	Expert Survey Fraunhofer ISI	no
Business people's level of openness to focus on social impact, scale of 1-6 (1: low; 6: high)	Expert Survey Fraunhofer ISI	no
Society appreciates altruism rather than the pursuit of individual profit, scale of 1-6 (1: individual benefit; 6: altruism)	Expert Survey Fraunhofer ISI	no
Commitment to improving inclusion, scale of 1-6 (1: low; 6: high)	Expert Survey Fraunhofer ISI	no
Socioeconomic inclusion as tasks, scale of 1-6 (1: job of state; 6: everyone's task)	Expert Survey Fraunhofer ISI	no
Entrepreneurial spirit in the country, scale of 1-6 (1: low; 6: high)	Expert Survey Fraunhofer ISI	no
Overall score for "inclusive innovation" supportive environment, scale of 1-6 (1: low; 6: high)	Expert Survey Fraunhofer ISI	no

Source: Fraunhofer ISI final concept

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TABLE 6E Final list of indicators – SUB-DIMENSION CAPACITY II

DETAILED INDICATOR DESCRIPTION	SOURCE	REVERSED
Quality of the education system, 1-7 (best)	World Economic Forum	no
Theoretical duration of primary education (years)	The World Bank	no
Total net enrolment ratio in primary education, both sexes	United Nations	no
Percentage of pupils starting grade 1 who reach last grade of primary, both sexes	United Nations	no
Literacy rates of 15-24 years old, both sexes, percentage	United Nations	no
Firm-level technology absorption, 1-7 (best)	World Economic Forum	no
FDI and technology transfer, 1-7 (best)	World Economic Forum	no
Capacity for innovation, 1-7 (best)	World Economic Forum	no
Ease of access to loans, 1-7 (best)	World Economic Forum	no
Venture capital availability, 1-7 (best)	World Economic Forum	no

Source: Fraunhofer ISI final concept

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TABLE 6F Final list of indicators – SUB-DIMENSION CAPACITY III

DETAILED INDICATOR DESCRIPTION	SOURCE	REVERSED
Ease of doing business index, Ranking 1-190 (1: best)	The World Bank	yes
Documents to import (number)	The World Bank	yes
Delay in obtaining an electrical connection (days)	The World Bank	yes
Firms formally registered when operations started (% of firms)	The World Bank	no
Firms competing against unregistered firms (% of firms)	The World Bank	yes
Transparency of government policymaking, 1-7 (best)	World Economic Forum	no
Firms expected to give gifts in meetings with tax officials (% of firms)	The World Bank	yes
Survey Question: Cheating on taxes if you have a chance [is justifiable], 1-10 (always justifiable)	World Values Survey	yes
Survey Question: Someone accepting a bribe in the course of their duties [is justifiable], 1-10 (always justifiable)	World Values Survey	yes
Legal rights index, 0-10 (best)	World Economic Forum	no

Source: Fraunhofer ISI final concept

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2.3 Aggregation, normalization and calculation of index values for final aggregate atlas dimensions

The next step in constructing a composite indicator involves aggregating the standardized and reversed indicators. We stuck to equal aggregation weights as these have proved to be most stable if variables have already been run through a pre-selection procedure (as in our case). Furthermore, it is often argued in the literature that equal weighting is the preferred option as it evades the problem of defining weights in a more or less arbitrary fashion and it delivers the most transparent results.

The next step in constructing a composite indicator involves aggregating the standardized and reversed indicators. We stuck to equal aggregation weights as these have proved to be most stable if variables have already been run through a pre-selection procedure (as in our case). Furthermore, it is often argued in the literature that equal weighting is the preferred option as it evades the problem of defining weights in a more or less arbitrary fashion and it delivers the most transparent results.

In this vein, the composite indicators for our sub-dimensions are calculated via the arithmetic mean of the (standardized) variable values within each sub-dimension. The mean value for each sub-index is calculated over all given answers per country. In other words, missing values are not taken into account for the calculation. This was done because dropping countries with missing values on each of the sub-dimensions would cancel out too many countries for the final calculation of the Inclusive Innovation Atlas. However, this was still problematic for the “Capacity I – preference for change” sub-dimension as the indicators from the World Values Survey (WVS) suffer from a rather large number of missing values. Where WVS variables are missing for certain countries, the other variables gain a relatively large weight for the calculation of the sub-dimension. The solution to the problem was to generate only one variable as the mean of all WVS variables and use only this variable for the index calculation. Robustness checks have shown that this leads to the most stable results for this sub-dimension.

The variables from the original expert survey were treated in a similar fashion. If taken as single variables, the 11 variables from the survey would gain a very large weight within the “Capacity I” sub-dimension and unduly limit the effect of other information from WVS or general sources. As a result, the survey variables were combined into one variable as the mean of all survey variables and this variable was included with a weight of five single variables, equivalent to the weight of all other variables in the subsection “Capacity I” (four single variables + aggregate WVS variable).

In order to facilitate an easier interpretation of the results for the single sub-dimensions as well as the dimensions “Challenges (I-III)” and “Capacity (I-III),” we normalized the respective sub-dimension values. To that end, we resorted to a simple mathematical transformation, assigning the largest country-value the value of 100 and the smallest country-value the value of 0 by subtracting the minimum value from the observed value and dividing by the range of the variable:

$$\text{Normalized value} = \left(\frac{\text{Observed value} - \text{minimum value}}{\text{Maximum value} - \text{minimum value}} \right) * 100$$

This normalization does not change the results and keeps the distances between the observed values but allows an easier overall interpretation of the calculated scores.

In a final step, the overall index values for “Challenges (I-III)” and “Capacity (I-III)” were calculated. The methodology is analogous to the one for the sub-dimensions; the mean value across all indicators in the respective sub-dimension in a given country forms the values for the “Challenges (I-III)” and “Capacity (I-III)” dimensions for the respective country.

For the generation of the final rankings, we only selected those countries that fell within the lower 75% quartile of the “Challenges” dimension. This basically serves as a filter alongside the actual needs for inclusive innovations within a country. The logic here is that countries with high socioeconomic, environmental and infrastructural living conditions do not have a need for demand-oriented solutions and are thus excluded from further analyses. This led to the exclusion of Malaysia, Brunei Darussalam, the Seychelles, Kazakhstan, Korea, Japan, Singapore and Hong Kong.

3 Measuring the current extent of activities (dedicated survey for this study)

Between April and July 2018, Fraunhofer ISI conducted a survey with two purposes.

As mentioned in the introduction, the survey was conducted primarily to enable, at minimum, a general assessment of the current prevalence of inclusive innovation activities in different countries while also allowing us to determine if there are entrepreneurial ecosystems in this field and to the extent to which national stakeholders consider the notion to be relevant for their activities.

Against this background, the following questions were put forward:

- How would you assess the current relevance and level of “inclusive innovation” activities in your country?
- How would you assess the overall entrepreneurial spirit in your country?
- To what extent are there active entrepreneurial communities that pursue “inclusive innovation” projects as startups or small firms?
- To what extent is the topic of “inclusive innovation” known and taken up...
 - in the policy domain?
 - by domestic corporates?
 - by foreign corporates?
- To what extent are there specific (or suitable) support programs for “inclusive innovation,” through, for example, government procurement?
- To what extent is there a supportive community of finance providers that caters to the needs of “inclusive innovators”?

Again, all these questions had to be answered on a scale of 1-6 to ensure comparability.

Additionally, however, several open questions were posed in order to gain deeper insights into the different types of inclusive innovation activities that are characteristic of the specific Asian countries:

- Please name five common sectors in which “inclusive innovations” are developed [in your country].
- Please name five common areas in which “inclusive innovations” are applied [in your country].
- Please name examples of up to five domestic companies that come to mind [with a view to inclusive innovation].

The answers to this part of the survey, however, provide insights into the actual level of inclusive innovation activities that can currently be observed in different countries.

Prior to this survey, this kind of information had not been available.

Additionally, the opportunity provided by the survey was leveraged to improve the availability of meaningful information for the first sub-index of the capacity dimension “Preference for change.” Due to the limited coverage of the World Values Survey, the availability of reliable secondary data on this aspect remained less than satisfactory so that, on that basis alone, the robustness of the sub-index could not be ascertained for several countries. Given this state of affairs, the additional collection of expert assessments was intended to enhance the reliability of the overall atlas.

The following questions were thus put forward:

BLOCK 1 INDEPENDENCE, WORK ETHIC

- Does your society appreciate individual hard work to improve one’s fate rather than accepting one’s given living conditions?
- Does your society appreciate people taking things in their own hands rather than following established authorities?
- Does your society appreciate people taking independent private initiative rather than taking action on government request?

BLOCK 2 CREATIVITY & SELF-EXPRESSION

- How would you assess societal appreciation for individual self-expression rather than adherence to established traditions?
- How would you assess societal appreciation for individual creativity and imagination rather than the reproduction of established knowledge?
- How would you assess your country’s business people’s openness to focusing on social impact rather than on profit and/or technology alone?

BLOCK 3 “DOING GOOD” & INCLUSIVENESS

- How would you assess general societal appreciation for altruism and “doing good” in society rather than the pursuit of individual profit?
- How would you assess general societal commitment to improving socioeconomic inclusion and fighting poverty?
- Would the average citizen consider socioeconomic inclusion and fighting poverty tasks to which individuals – rather than the state – should contribute?

All questions had to be answered on a scale of 1-6 to ensure comparability.

Data collection and processing

The initial target population for the survey was established jointly by Fraunhofer ISI, the Bertelsmann Stiftung and Intellectap, an intermediary organization in the field of impact investment with Asian home bases in India, Indonesia and the Philippines.

Care was taken to establish a sample of potential respondents that covers a good mix of practitioners (e.g., entrepreneurs, investors), NGOs (e.g., aid workers and intermediaries) and academic experts (both national and international). This list of respondents was established by combining Intellectap's extensive network among practitioners, the Bertelsmann Stiftung's strong contacts to many NGOs and Fraunhofer ISI's networks to global academic peers.

In the sample, the distribution across these groups of respondent types was intended to be similar across countries, if not necessarily across the eventual responses. In general, the chosen survey approach was meant to allow for a differentiation in respondent types by country not as a premise, but as an outcome, acknowledging that the different socioeconomic framework conditions across Asia's countries would enable different experts to provide relevant answers.

From late April 2018 onwards, more than 300 potential respondents were contacted via repeated standardized emails, accompanied by follow-up phone calls and personal emails by all three parties involved. Initially, it proved somewhat challenging to identify and motivate possible respondents outside Intellectap's home bases but, eventually, a concerted web search and persistent efforts to convince known experts to participate increased the turnout substantially.

Technically, data was collected through QuestBack's EFS data collection tool, which allows real-time tracking of answers already received, and thus aided and guided the efforts of targeted mobilization that were required toward the end of the field phase.

In the end, 77 responses were collected for 21 countries (i.e., an average of 3.7 answers per country), ensuring triangulation and preventing a reliance on single opinions. To our knowledge, this is the broadest survey on inclusive innovation ever, in any case with a view to its outreach across less commonly studied Asian countries.

In practice, the distribution is, as expected, a bit more unbalanced, although the analysts ensured that no country received less than two answers. In detail, the following number of answers were collected per country: Afghanistan (3), Bangladesh (5), Bhutan (2), Cambodia (3), China (4), India (9), Indonesia (10), Iran (2), Kyrgyz Republic (2), Laos (4), Mongolia (2), Myanmar (4), Nepal (4), Pakistan (4), Papua New Guinea (2), Philippines (5), Sri Lanka (4), Tajikistan (2), Thailand (2), Uzbekistan (2) and Vietnam (2).

Subsequent to their collection, all answers received were manually checked for consistency within the respective country. Despite notable deviations in single values, no single response deviated to an extent that would have suggested its exclusion on grounds of obvious subjectivity. In principle, some notable deviations

had been expected given the (intended) diversity of perspectives between different respondent types and, not least, the fact that the actual situation can indeed differ substantially within larger nations.

Utilization of survey data

Finally, averages were calculated based on all responses received for a certain country and the resulting variable saved in a country-based dataset.

In the case of the first batch, in order to improve the analysis of capacities, they were integrated into the first sub-index (Preference for change) of the capacity dimension according to a procedure explained in more detail in the methodological report. Subsequently, the overall index for the capacity dimension was recalculated and the final atlas of potentials for inclusive innovation updated.

The variables of the second batch refer to the current situation rather than to the consideration of future-oriented potentials, which means they cannot be integrated into the Inclusive Innovation Atlas as such. Instead, they have been translated into figures highlighting the current relevance activity in a final chapter of the report. Each individual aspect was illustrated in a bar chart and some were juxtaposed in matrix graphics.

4 Indicator details

4.1 Indicators for the dimension

“Challenges I – poor infrastructure / harsh environment”

In the following, the indicators used for the construction of the composite indicator “Challenges I – poor infrastructure / harsh environment” are described in more detail.

Quality of overall infrastructure, scale of 1-7 (best)

Indicator Description / Survey Question: How would you assess general infrastructure (e.g., transport, telephony and energy) in your country? [1: extremely underdeveloped – among the worst in the world; 7: extensive and efficient – among the best in the world]

Original Source / Survey Participants: Survey of business leaders worldwide (Executive Opinion Survey)

Source: World Economic Forum – Global Competitiveness Index (Original Source: WEF Executive Opinion Survey), Coverage: 2007–2016, annually, reversed: yes

Improved water source, rural (% of rural population with access)

Indicator Description / Survey Question: Access to an improved water source, rural, refers to the percentage of the rural population using an improved drinking-water source. The improved source includes piped water on premises (piped household water connection located inside the user’s dwelling, plot or yard) and other improved drinking-water sources (public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs, and rainwater collection).

Original Source / Survey Participants: National censuses and nationally representative household surveys

Source: The World Bank – World Development Indicators (Original Source: WHO/ UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation (ws-sinfo.org)), Coverage: 1990–2015, annually, reversed: yes

Improved sanitation facilities (% of population with access)

Indicator Description / Survey Question: Access to improved sanitation facilities refers to the percentage of the population using improved sanitation facilities. Improved sanitation facilities are likely to ensure hygienic separation of human excreta from human contact. They include flush / pour flush (to piped sewer system, septic tank, pit latrine), ventilated improved pit (VIP) latrine, pit latrine with slab, and composting toilets.

Original Source / Survey Participants: National censuses and nationally representative household surveys

Source: The World Bank – World Development Indicators (Original Source: WHO/ UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation (ws-sinfo.org)), Coverage: 1990–2015, annually, reversed: yes

Fixed telephone subscriptions (per 100 people)

Indicator Description / Survey Question: Sum of active number of analogue fixed telephone lines, voice-over-IP (VoIP) subscriptions, fixed wireless local loop (WLL) subscriptions, ISDN voice-channel equivalents and fixed public payphones. The telephone lines (per 100 people) indicator is derived by dividing all telephone lines by the country's population and multiplying by 100.

Original Source / Survey Participants: Primary data, International Telecommunication Union

Source: The World Bank – World Development Indicators (Original Source: International Telecommunication Union, World Telecommunication / ICT Development Report and Database), Coverage: 1975–2015, annually, reversed: yes

Automated teller machines (ATMs) (per 100,000 adults)

Indicator Description / Survey Question: Data are shown as the total number of ATMs for every 100,000 adults in the reporting country.

Original Source / Survey Participants: Administrative data (collected from traditional financial service providers or other deposit-taking institutions and providers of digital financial services)

Source: The World Bank – World Development Indicators (Original Source: International Monetary Fund, Financial Access Survey), Coverage: 2001–2015, annually, reversed: yes

Biocapacity index

Indicator Description / Survey Question: The ecological footprint is the area of land and water it takes for a human population to generate the renewable resources it consumes and to absorb the corresponding waste it generates, using prevailing technology. In other words, it measures the “quantity of nature” that we use and compares it with how much “nature” we have. (Source: Global Footprint Network,

2016). Calculation here: Total Biocapacity – Total Ecological Footprint (excluding Carbon Footprint)

Original Source / Survey Participants: Calculations from secondary data, see: Ecological Indicators Journal (Vol. 24: pages 518–533)

Source: Yale University – 2016 Environmental Performance Index (EPI), raw data (Original Source: United Nations, Department of Economic and Social Affairs, Population Division: World Population Prospects, 2012 Revision), Coverage: 1990, 1995, 2000, 2005, 2010, 2013, reversed: yes

Environmental risk exposure

Indicator Description / Survey Question: Risk of water and air pollution to human health proxied by child mortality (probability of a child dying between his or her first and fifth birthday, per 1,000 one-year-old children).

Original Source / Survey Participants: Estimates and projections by the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat

Source: The World Bank – World Development Indicators (Original Source: International Monetary Fund, Financial Access Survey), Coverage: 2001–2015, annually, reversed: no

Air pollution – Average exposure to fine particulate matter (population-weighted, three-year average)

Indicator Description / Survey Question: Population-weighted exposure to fine particulate matter (PM_{2.5}, particles or droplets in the air that are 2.5 microns or less in width)

Original Source / Survey Participants: Measurement data, satellite-derived estimates

Source: Yale University – 2016 Environmental Performance Index (EPI), raw data, Coverage: 2000–2014, annually, reversed: no

4.2 Indicators for the dimension

“Challenges II – low socioeconomic development”

In the following, the indicators used for the construction of the composite indicator “Challenges II – low socioeconomic development” are described in more detail.

Population below \$1.25 (PPP) per day, percentage

Indicator Description / Survey Question: The poverty rate at \$1.25 a day is the proportion of the population living on less than \$1.25 a day, measured at 2005 international prices, adjusted for purchasing power parity (PPP).

Original Source / Survey Participants: Household surveys, The World Bank

Source: United Nations Statistics Division: Millennium Development Goals Database (Original Source: World Bank (2013), “World Development Indicators” 2013), Coverage: 1990–2012, annually, reversed: no

Survey mean consumption or income per capita, bottom 40% of population

Indicator Description / Survey Question: Mean consumption or income per capita (2011 PPP \$ per day) used in calculating the growth rate in the welfare aggregate of the bottom 40% of the population in the income distribution in a country.

Original Source / Survey Participants: Household surveys, The World Bank

Source: The World Bank, Global Database of Shared Prosperity (GDSP), Coverage: 2003–2015, annually, reversed: yes

Population undernourished, percentage

Indicator Description / Survey Question: The proportion of the population below the minimum level of dietary energy consumption, referred to as the prevalence of undernourishment, is the percentage of the population that is undernourished or food deprived.

Original Source / Survey Participants: Estimates by the Food and Agricultural Organization (FAO)

Source: United Nations Statistics Division: Millennium Development Goals Database (Original Source: Food and Agricultural Organization (FAO)), Coverage: 1991–2015, annually, reversed: no

Infant mortality rate (0-1 year) per 1,000 live births

Indicator Description / Survey Question: Infant mortality rate is the probability of a child born in a specific year or period dying before reaching the age of one, if subject to age-specific mortality rates of that period.

Original Source / Survey Participants: Civil registration with complete coverage (preferred)

Source: United Nations Statistics Division: Millennium Development Goals Database (Original Source: World Health Organization: WHO Data), Coverage: 1960–2015, annually, reversed: no

Cause of death, by injury (% of total)

Indicator Description / Survey Question: Cause of death refers to the share of all deaths for all ages by underlying causes. Injuries include unintentional and intentional injuries.

Original Source / Survey Participants: Derived, based on the data from WHO's World Health Statistics (from national vital registry systems as well as sample registration systems, population laboratories, and epidemiological analysis of specific conditions)

Source: The World Bank, World Development Indicators (Original Source: WHO's World Health Statistics), Coverage: 2000–2015, annually, reversed: no

Tuberculosis prevalence rate per 100,000 population (mid-point)

Indicator Description / Survey Question: Tuberculosis prevalence refers to the number of cases of TB (all forms) in a population at a given point in time (sometimes referred to as "point prevalence"). It is expressed as the number of cases per 100,000 population.

Original Source / Survey Participants: Estimates of TB prevalence are based on a consultative and analytical process led by WHO and are published annually.

Source: United Nations Statistics Division: Millennium Development Goals Database (Original Source: WHO), Coverage: 1990–2013, annually, reversed: no

Survey Question: Last 12 months, gone without enough food, 1-4 (never)

Indicator Description / Survey Question: In the last 12 months, how often have you or your family gone without enough food to eat [1: often; 4: never]

Original Source / Survey Participants: WVS (nationally representative surveys)

Source: World Values Survey, Coverage: 2010–2014 (wave), reversed: no

Export diversification index

Indicator Description / Survey Question: The export diversification measure is based on the Theil Index – an entropy measure commonly used to measure economic inequality – following the definitions and methods used in Cadot et al. (2011) (Review of Economics and Statistics Vol. 93: pages 590–605).

Original Source / Survey Participants: Estimate based on COMTRADE bilateral trade flow data at the 4-digit SITC (Rev. 1) level

Source: International Monetary Fund, Export Diversification and Quality Database (Spring 2014) (Original Source: UN–NBER dataset), Coverage: 1962–2010, annually, reversed: yes

Export quality index

Indicator Description / Survey Question: Export quality is estimated using data on trade prices, values, quantities and a host of other information. More detailed information can be found in Henn, C., Papageorgiou, C. and Spatafora, N., 2013, "Export Quality in Developing Countries," IMF Working Paper 13/108.

Original Source / Survey Participants: Estimate based on COMTRADE bilateral trade flow data at the 4-digit SITC (Rev. 1) level

Source: International Monetary Fund, Export Diversification and Quality Database (Spring 2014) (Original Source: UN–NBER dataset), Coverage: 1962–2010, annually, reversed: yes

4.3 Indicators for the dimension “Challenges III – vulnerability and disparities”

In the following, the indicators used for the construction of the composite indicator “Challenges III – vulnerability and disparities” are described in more detail.

Gini index, scale of 0 (perfect equality) – 100 (perfect inequality)

Indicator Description / Survey Question: The Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Gini coefficient of 0 represents perfect equality, while 100 implies perfect inequality.

Original Source / Survey Participants: Primary household survey data obtained from government statistical agencies and World Bank country departments.

Source: The World Bank, World Development Indicators, Coverage: 1981–2014, annually, reversed: no

Income share held by lowest 20%

Indicator Description / Survey Question: Percentage share of income or consumption is the share that accrues to population sub-groups indicated by deciles or quintiles.

Original Source / Survey Participants: Primary household survey data obtained from government statistical agencies and World Bank country departments.

Source: The World Bank, World Development Indicators, Coverage: 1981–2014, annually, reversed: yes

Youth unemployment rate, aged 15-24, both sexes

Indicator Description / Survey Question: The youth unemployment rate is the proportion of the youth labor force that is unemployed. Young people are defined as persons aged between 15 and 24.

Original Source / Survey Participants: Mostly from household surveys or population censuses

Source: United Nations Statistics Division: Millennium Development Goals Database, Coverage: 1990–2014, annually, reversed: no

Employment-to-population ratio, both sexes, percentage

Indicator Description / Survey Question: The employment-to-population ratio is the proportion of a country's working-age population that is employed.

Original Source / Survey Participants: Secondary data from international repositories or national sources

Source: United Nations Statistics Division: Millennium Development Goals Database (Original Source: International Labour Organization (ILO)), Coverage: 1990-2014, annually, reversed: yes

Slum population as percentage of urban, percentage

Indicator Description / Survey Question: The proportion of urban population living in slums is the proportion of urban population living in slum households.

Original Source / Survey Participants: United Nations estimate

Source: United Nations Statistics Division: Millennium Development Goals Database, Coverage: 1995-2014, reversed: no

Vulnerable employment, total (% of total employment)

Indicator Description/Survey Question: Vulnerable employment is defined as contributing family workers and own-account workers as a percentage of total employment.

Original Source / Survey Participants: World Bank staff estimates based on data from the International Labour Organization, ILOSTAT database.

Source: The World Bank, World Development Indicators, Coverage: 1960-2016, annually, reversed: no

Population using solid fuels, percentage

Indicator Description / Survey Question: The percentage of population using solid fuels is the percentage of the population that relies on solid fuels as the primary source of domestic energy for cooking and heating. Solid fuels include biomass fuels, such as wood, charcoal, crops or other agricultural waste, dung, shrubs and straw, and coal.

Original Source / Survey Participants: Household surveys and national censuses

Source: United Nations Statistics Division: Millennium Development Goals Database (Original Source: WHO – Global indoor air pollution database), Coverage: 1990-2010, annually, reversed: no

4.4 Indicators for the dimension “Capacity I – preference for change”

In the following, the indicators used for the construction of the composite indicator “Capacity I – preference for change” are described in more detail.

Mobile cellular subscriptions (per 100 people)

Indicator Description / Survey Question: Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service that provide access to the PSTN using cellular technology.

Original Source / Survey Participants: Primary data, International Telecommunication Union

Source: The World Bank, World Development Indicators (Original Source: International Telecommunication Union, World Telecommunication/ICT Development Report and database), Coverage: 1960–2015, annually, reversed: no

Internet users (per 100 people)

Indicator Description / Survey Question: Internet users are individuals who have used the internet (from any location) in the last three months.

Original Source / Survey Participants: Primary data, International Telecommunication Union

Source: The World Bank, World Development Indicators (Original Source: International Telecommunication Union, World Telecommunication/ICT Development Report and database), Coverage: 1960–2015, annually, reversed: no

International migrant stock (% of population)

Indicator Description / Survey Question: International migrant stock is the number of people born in a country other than that in which they live. It also includes refugees.

Original Source / Survey Participants: United Nations Population Division, Trends in Total Migrant Stock

Source: The World Bank, World Development Indicators (Original Source: United Nations Population Division, Trends in Total Migrant Stock), Coverage: 1960–2015, annually, reversed: no

Survey Question: Private vs. government ownership, scale of 1-10 (Government ownership of business should be increased)

Indicator Description / Survey Question: How would you place your views on this scale? 1 means you agree completely with the statement on the left; 10 means you agree completely with the statement on the right; and if your views fall somewhere in between, you can choose any number in between. [1: Private ownership

of business should be increased; 10: Government ownership of business should be increased]

Original Source / Survey Participants: WVS (nationally representative surveys)

Source: World Values Survey, Coverage: 1990–2014, waves, reversed: no

Survey Question: Private vs. government responsibility, scale of 1-10 (Government should take more responsibility)

Indicator Description / Survey Question: How would you place your views on this scale? 1 means you agree completely with the statement on the left; 10 means you agree completely with the statement on the right; and if your views fall somewhere in between, you can choose any number in between. [1: People should take more responsibility; 10: The government should take more responsibility]

Original Source / Survey Participants: WVS (nationally representative surveys)

Source: World Values Survey, Coverage: 1990–2014, waves, reversed: no

Survey Question: Important child qualities – tolerance and respect for other people, scale of 0-1 (important)

Indicator Description / Survey Question: Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five! [0: not mentioned; 1: important]

Original Source / Survey Participants: WVS (nationally representative surveys)

Source: World Values Survey, Coverage: 1981–2014, waves, reversed: no

Survey Question: Important child qualities – obedience, scale of 0-1 (important)

Indicator Description / Survey Question: Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five! [0: not mentioned; 1: important]

Original Source / Survey Participants: WVS (nationally representative surveys)

Source: World Values Survey, Coverage: 1981–2014, waves, reversed: yes

Survey Question: Important child qualities – independence, scale of 0-1 (important)

Indicator Description / Survey Question: Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five! [0: not mentioned; 1: important]

Original Source / Survey participants: WVS (nationally representative surveys)

Source: World Values Survey, Coverage: 1981–2014, waves, reversed: no

Survey Question: Important child qualities – imagination, scale of 0-1 (important)

Indicator Description / Survey Question: Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five! [0: not mentioned; 1: important]

Original Source / Survey participants: WVS (nationally representative surveys)

Source: World Values Survey, Coverage: 1981–2014, waves, reversed: no

Survey Question: Important child qualities – self-expression, scale of 0-1 (important)

Indicator Description / Survey Question: Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five! [0: not mentioned; 1: important]

Original Source / Survey Participants: WVS (nationally representative surveys)

Source: World Values Survey, Coverage: 2010–2014, waves, reversed: no

Survey Question: Greater respect for authority (is good or bad), scale of 1-3 (bad)

Indicator Description / Survey Question: I'm going to read out a list of various changes in our way of life that might take place in the near future. Please tell me for each one, if it were to happen, whether you think it would be a good thing, a bad thing, or don't you mind? [1: good; 3: bad]

Original Source / Survey Participants: WVS (nationally representative surveys)

Source: World Values Survey, Coverage: 1981–2014, waves, reversed: yes

Survey Question: Hard work vs. luck as a driver of success, scale of 1-10 (Hard work doesn't bring success, luck and connections matter more)

Indicator Description / Survey Question: How would you place your views on this scale? 1 means you agree completely with the statement on the left; 10 means you agree completely with the statement on the right; and if your views fall somewhere in between, you can choose any number in between. [1: In the long run, hard work usually brings a better life; 10: Hard work doesn't generally bring success, it's more a matter of luck and connections]

Original Source / Survey Participants: WVS (nationally representative surveys)

Source: World Values Survey, Coverage: 1990–2014, waves, reversed: no

Survey Question: Tolerance as concerns income inequality, scale of 1-10 (We need larger income differences as incentives)

Indicator Description / Survey Question: How would you place your views on this scale? 1 means you agree completely with the statement on the left; 10 means you

agree completely with the statement on the right; and if your views fall somewhere in between, you can choose any number in between. [1: Incomes should be made more equal; 10: We need larger income differences as incentives]

Original Source / Survey Participants: WVS (nationally representative surveys)

Source: World Values Survey, Coverage: 1990–2014, waves, reversed: no

Women in labor force, ratio to men

Indicator Description / Survey Question: Percentage of women aged 15–64 participating in the labor force divided by percentage of men aged 15–64 participating in the labor force.

Original Source / Survey Participants: Secondary data from international repositories or national sources

Source: World Economic Forum, Global Competitiveness Index (Original Source: International Labour Organization, Key Indicators of the Labour Markets, 9th Edition), Coverage: 2007–2016, annually, reversed: no

Survey Question: It is important to think up new ideas and be creative, scale of 1-6 (not at all like me)

Indicator Description / Survey Question: Now I will briefly describe some people. Using this card, would you please indicate for each description whether that person is very much like you, like you, somewhat like you, not like you, or not at all like you? [1: very much like me; 6: not at all like me]

Original Source / Survey Participants: WVS (nationally representative surveys)

Source: World Values Survey, Coverage: 2005–2014, waves, reversed: yes

Survey Question: It is important to do something for the good of society, scale of 1-6 (not at all like me)

Indicator Description / Survey Question: Now I will briefly describe some people. Using this card, would you please indicate for each description whether that person is very much like you, like you, somewhat like you, not like you, or not at all like you? [1: very much like me; 6: not at all like me]

Original Source / Survey Participants: WVS (nationally representative surveys)

Source: World Values Survey, Coverage: 2010–2014, waves, reversed: yes

Society appreciates individual hard work to improve one's fate rather than accepting living conditions, scale of 1-6 (1: accept one's fate; 6: change it through hard work)

Indicator Description/Survey Question: Does your society appreciate individual hard work to improve one's fate rather than accepting one's given living conditions? (1: accept one's fate; 6: change it through hard work)

Original Source / Survey Participants: Expert Survey, Fraunhofer ISI

Source: Expert Survey by Fraunhofer ISI, Coverage: 2018, reversed: no

Society appreciates own initiative rather than following established authorities, scale of 1-6 (1: follow authorities; 6: own initiative)

Does your society appreciate people taking things in their own hands rather than following established authorities? (1: follow authorities; 6: own initiative)

Original Source / Survey Participants: Expert Survey, Fraunhofer ISI

Source: Expert Survey by Fraunhofer ISI, Coverage: 2018, reversed: no

Society appreciates independent private initiative rather than merely taking action on government request, scale of 1-6 (1: respond to government; 6: private initiative)

Does your society appreciate people taking independent private initiative rather than taking action on government request? (1: respond to government; 6: private initiative)

Original Source / Survey Participants: Expert Survey, Fraunhofer ISI

Source: Expert Survey by Fraunhofer ISI, Coverage: 2018, reversed: no

Society appreciates individual self-expression rather than adherence to traditions, scale of 1-6 (1: follow traditions; 6: self-expression)

How would you assess societal appreciation for individual self-expression rather than adherence to established traditions? (1: follow traditions; 6: self-expression)

Original Source/Survey Participants: Expert Survey, Fraunhofer ISI

Source: Expert Survey by Fraunhofer ISI, Coverage: 2018, reversed: no

Society appreciates own creativity rather than reproduction of knowledge, scale of 1-6 (1: reproduction; 6: creativity)

How would you assess societal appreciation for own creativity and imagination rather than the reproduction of established knowledge? (1: reproduction; 6: creativity)

Original Source / Survey Participants: Expert Survey, Fraunhofer ISI

Source: Expert Survey by Fraunhofer ISI, Coverage: 2018, reversed: no

Business people's openness to focusing on social impact, scale of 1-6 (1: low; 6: high)

How would you assess your country's business people's openness to focusing on social impact rather than on profit and/or technology alone? (1: low; 6: high)

Original Source / Survey Participants: Expert Survey, Fraunhofer ISI

Source: Expert Survey by Fraunhofer ISI, Coverage: 2018, reversed: no

Society appreciates altruism rather than the pursuit of individual profit, scale of 1-6 (1: individual benefit; 6: altruism)

How would you assess general societal appreciation for altruism and “doing good” in society rather than the pursuit of individual profit? (1: individual benefit; 6: altruism)

Original Source / Survey Participants: Expert Survey, Fraunhofer ISI

Source: Expert Survey by Fraunhofer ISI, Coverage: 2018, reversed: no

Commitment to improving inclusion, scale of 1-6 (1: low; 6: high)

How would you assess general societal commitment to improving socioeconomic inclusion and fighting poverty? (1: low; 6: high)

Original Source / Survey Participants: Expert Survey, Fraunhofer ISI

Source: Expert Survey by Fraunhofer ISI, Coverage: 2018, reversed: no

Socioeconomic inclusion as tasks, scale of 1-6 (1: job of the state; 6: everyone's task)

Would the average citizen consider socioeconomic inclusion and fighting poverty as tasks to which individuals – rather than the state – should contribute? (1: job of the state; 6: everyone's task)

Original Source / Survey Participants: Expert Survey, Fraunhofer ISI

Source: Expert Survey by Fraunhofer ISI, Coverage: 2018, reversed: no

Entrepreneurial spirit in the country, scale of 1-6 (1: low; 6: high)

How would you assess the overall entrepreneurial spirit in the country? (1: low; 6: high)

Original Source / Survey Participants: Expert Survey, Fraunhofer ISI

Source: Expert Survey by Fraunhofer ISI, Coverage: 2018, reversed: no

Overall score for “inclusive innovation” supportive environment, scale of 1-6 (1: low; 6: high)

Overall score for “inclusive innovation” supportive environment (1: low; 6: high)

Original Source / Survey Participants: Expert Survey, Fraunhofer ISI

Source: Expert Survey by Fraunhofer ISI, Coverage: 2018, reversed: no

4.5 Indicators for the dimension “Capacity II – absorptive capacity for innovation”

In the following, the indicators used for the construction of the composite indicator “Capacity II – absorptive capacity for innovation” are described in more detail.

Quality of the education system, 1-7 (best)

Indicator Description / Survey Question: In your country, how well does the education system meet the needs of a competitive economy? [1: not well at all; 7: extremely well]

Original Source / Survey Participants: World Economic Forum, Executive Opinion Survey

Source: World Economic Forum, Global Competitiveness Index (Original Source: WEF Executive Opinion Survey), Coverage: 2007–2016, annually, reversed: no

Theoretical duration of primary education (years)

Indicator Description / Survey Question: Number of grades (years) in primary education

Original Source / Survey Participants: Collection by the UNESCO Institute for Statistics

Source: The World Bank, World Development Indicators (Original Source: UNESCO Institute for Statistics), Coverage: 1970–2015, annually, reversed: no

Total net enrollment ratio in primary education, both sexes

Indicator Description / Survey Question: Net primary enrollment rate in primary education is the number of children of official primary school age (ISCED971) who are enrolled in primary education as a percentage of the total children of the official school age population.

Original Source / Survey Participants: Enrollment data reported by education ministries or national statistical offices and UN population estimates

Source: UN Statistics Division: Millennium Development Goals Database (Original Source: UNESCO Institute for Statistics), Coverage: 1990–2014, annually, reversed: no

Percentage of pupils starting grade 1 who reach last grade of primary, both sexes

Indicator Description / Survey Question: The proportion of pupils starting grade 1 who reach last grade of primary education, known as the survival rate to last grade of primary, is the percentage of a cohort of pupils enrolled in grade 1 of the primary level of education in a given school year who are expected to reach the last grade of primary school, regardless of repetition.

Original Source / Survey Participants: Enrollments and repeaters' data reported by education ministries or national statistical offices and UN population estimates

Source: United UN Statistics Division: Millennium Development Goals Database (Original Source: UNESCO Institute for Statistics), Coverage: 1990–2014, annually, reversed: no

Literacy rates of 15-24 year-olds, both sexes, percentage

Indicator Description / Survey Question: Literacy rate of 15–24-year-olds, or the youth literacy rate, is the percentage of the population aged 15–24 years which can both read and write with understanding a short simple statement on everyday life.

Original Source / Survey Participants: Estimations based on observed data reported by countries and territories

Source: UN Statistics Division: Millennium Development Goals Database (Original Source: UNESCO Institute for Statistics), Coverage: 1990–2014, annually, reversed: no

Firm-level technology absorption, 1-7 (best)

Indicator Description / Survey Question: In your country, to what extent do businesses adopt the latest technologies? [1: not at all; 7: to a great extent]

Original Source / Survey Participants: World Economic Forum, Executive Opinion Survey

Source: World Economic Forum, Global Competitiveness Index (Original Source: WEF Executive Opinion Survey), Coverage: 2007–2016, annually, reversed: no

FDI and technology transfer, 1-7 (best)

Indicator Description / Survey Question: In your country, to what extent do businesses adopt the latest technologies? [1: not at all; 7: to a great extent]

Original Source / Survey Participants: World Economic Forum, Executive Opinion Survey

Source: World Economic Forum, Global Competitiveness Index (Original Source: WEF Executive Opinion Survey), Coverage: 2007–2016, annually, reversed: no

Capacity for innovation, 1-7 (best)

Indicator Description / Survey Question: In your country, to what extent do companies have the capacity to innovate? [1: not at all; 7: to a great extent]

Original Source / Survey Participants: World Economic Forum, Executive Opinion Survey

Source: World Economic Forum, Global Competitiveness Index (Original Source: WEF Executive Opinion Survey), Coverage: 2007–2016, annually, reversed: no

Ease of access to loans, 1-7 (best)

Indicator Description / Survey Question: In your country, how easy is it for businesses to obtain a bank loan? [1: extremely difficult; 7: extremely easy]

Original Source / Survey Participants: World Economic Forum, Executive Opinion Survey

Source: World Economic Forum, Global Competitiveness Index (Original Source: WEF Executive Opinion Survey), Coverage: 2007–2016, annually, reversed: no

Venture capital availability, 1-7 (best)

Indicator Description / Survey Question: In your country, how easy is it for start-up entrepreneurs with innovative but risky projects to obtain equity funding? [1: extremely difficult; 7: extremely easy]

Original Source / Survey Participants: World Economic Forum, Executive Opinion Survey

Source: World Economic Forum, Global Competitiveness Index (Original Source: WEF Executive Opinion Survey), Coverage: 2007–2016, annually, reversed: no

4.6 Indicators for the dimension**“Capacity III – robust institutions and governance”**

In the following, the indicators used for the construction of the composite indicator “Capacity III – robust institutions and governance” are described in more detail.

Ease of doing business index, Ranking 1-190 (1: best)

Indicator Description / Survey Question: Ease of doing business ranks economies from 1 to 190, with first place being the best, i.e. 1 = most business-friendly regulations. A high ranking (a low numerical rank) means that the regulatory environment is conducive to business operation.

Original Source / Survey Participants: World Bank standardized expert survey that uses a simple business case to ensure comparability across economies and over time

Source: The World Bank, World Development Indicators (Original Source: World Bank, Doing Business project), Coverage: 2015–2016, reversed: yes

Documents to import (number)

Indicator Description / Survey Question: All documents required per shipment to import goods are recorded.

Original Source / Survey Participants: World Bank estimate that records the time and cost (excluding tariffs) associated with exporting and importing a standardized cargo of goods by sea transport.

Source: The World Bank, World Development Indicators (Original Source: World Bank, Doing Business project), Coverage: 2005–2014, annually, reversed: yes

Delay in obtaining an electrical connection (days)

Indicator Description / Survey Question: Delay in obtaining an electrical connection is the average wait, in days, experienced to obtain an electrical connection from the day an establishment applies for it to the day it receives the service.

Original Source / Survey Participants: Firm-level surveys by the World Bank (Enterprise Analysis Unit)

Source: The World Bank, World Development Indicators (Original Source: World Bank, Enterprise Surveys), Coverage: 2002–2016, annually, reversed: yes

Firms formally registered when operations started (% of firms)

Indicator Description / Survey Question: Firms formally registered when operations started are the percentage of firms formally registered when they started operations in the country.

Original Source / Survey Participants: Firm-level surveys by the World Bank (Enterprise Analysis Unit)

Source: The World Bank, World Development Indicators (Original Source: World Bank, Enterprise Surveys), Coverage: 2006–2016, annually, reversed: no

Firms competing against unregistered firms (% of firms)

Indicator Description / Survey Question: Firms competing against unregistered firms are the percentage of firms competing against unregistered or informal firms.

Original Source / Survey Participants: Firm-level surveys by the World Bank (Enterprise Analysis Unit)

Source: The World Bank, World Development Indicators (Original Source: World Bank, Enterprise Surveys), Coverage: 2006–2016, annually, reversed: yes

Transparency of government policymaking, 1-7 (best)

Indicator Description / Survey Question: In your country, how easy is it for companies to obtain information about changes in government policies and regulations affecting their activities? [1: extremely difficult; 7: extremely easy]

Original Source / Survey Participants: Survey of business leaders worldwide (Executive Opinion Survey)

Source: World Economic Forum Global Competitiveness Index (Original Source: WEF Executive Opinion Survey), Coverage: 2007–2016, annually, reversed: no

Firms expected to give gifts in meetings with tax officials (% of firms)

Indicator Description / Survey Question: Firms expected to give gifts in meetings with tax officials is the percentage of firms that answered positively to the question “Was a gift or informal payment expected or requested during a meeting with tax officials?”

Original Source / Survey Participants: Firm-level surveys by the World Bank (Enterprise Analysis Unit)

Source: The World Bank, World Development Indicators (Original Source: World Bank, Enterprise Surveys), Coverage: 2002–2016, annually, reversed: yes

Survey question: Cheating on taxes if you have a chance [is justifiable], scale of 1-10 (always justifiable)

Indicator Description / Survey Question: Please tell me for each of the following actions whether you think it can always be justified, never be justified, or something in between, using this card. [1: never justifiable; 10: always justifiable]

Original Source / Survey Participants: WVS (nationally representative surveys)

Source: World Values Survey, Coverage: 1981–2014, waves, reversed: yes

Survey question: Someone accepting a bribe [is justifiable], scale of 1-10 (always justifiable)

Indicator Description / Survey Question: Please tell me for each of the following actions whether you think it can always be justified, never be justified, or something in between, using this card. [1: never justifiable; 10: always justifiable]

Original Source / Survey Participants: WVS (nationally representative surveys)

Source: World Values Survey, Coverage: 1981–2014, waves, reversed: yes

Legal rights index, 0-10 (best)

Indicator Description / Survey Question: Strength of legal rights index measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending. The index ranges from 0 to 10. Higher scores indicate that these laws are better designed to expand access to credit.

Original Source / Survey Participants: World bank standardized expert survey that uses a simple business case to ensure comparability across economies and over time

Source: World Economic Forum, Global Competitiveness Index (Original Source: World Bank, Doing Business project), Coverage: 2007–2016, annually, reversed: no

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List of figures and tables

EXECUTIVE SUMMARY 8

FIGURE 1	Overall level of inclusive innovation activities, from 1 (very low) to 6 (very high)	11
FIGURE 2	Entrepreneurial activities vs. acknowledgment in the policy domain	12
FIGURE 3	Local challenges and capacity factors as triggers and enablers of inclusive innovation	13
FIGURE 4	Overall severity of local challenges, according to the Inclusive Innovation Atlas	14
FIGURE 5	Overall level of relevant capacity, according to the Inclusive Innovation Atlas	15
FIGURE 6	Country clusters defined by opportunities for inclusive innovation	16

CONCEPTUAL REPORT 18

FIGURE 1	Key dimensions and sub-dimensions of the Inclusive Innovation Atlas	25
FIGURE 2	Matrix illustration of the Inclusive Innovation Atlas's findings	26
FIGURE 3	Sub-dimensions of the local challenges dimension	27
FIGURE 4	Sub-dimensions of the capacity dimension	31

FINDINGS 36

FIGURE 1	Overall level of inclusive innovation activities, ranging from 1 (very low) to 6 (very high)	37
FIGURE 2	Entrepreneurial activities vs. acknowledgment in the policy domain	38
FIGURE 3	Approach pursued by the Inclusive Innovation Atlas	39
FIGURE 4	Overall severity of local challenges, according to the Inclusive Innovation Atlas	40
FIGURE 5	Challenges I – Poor infrastructure and harsh environment	41
FIGURE 6	Challenges II – Low levels of socioeconomic development	41
FIGURE 7	Challenges III – Vulnerability and disparities	42

FIGURE 8	Overall level of relevant capacity, according to Inclusive Innovation Atlas	43
FIGURE 9	Capacity I – Preference for change	43
FIGURE 10	Capacity II – Absorptive capacity for innovation	44
FIGURE 11	Capacity III – Robust institutions and governance	45
FIGURE 12	Country clusters defined by opportunities for inclusive innovation	46
FIGURE 13	Detailed profiles of countries offering challenge-driven opportunities	47
FIGURE 14	Detailed profiles of countries that are natural environments for inclusive innovation	47
FIGURE 15	Detailed profiles of countries offering capacity-driven opportunities	47

ANNEX: METHODOLOGY 48

FIGURE 1	The two dimensions of the Atlas	51
FIGURE 2	Sub-dimensions of the challenge dimension	51
FIGURE 3	Sub-dimensions of the capacity dimension	51
TABLE 1	List of countries surveyed	53
TABLE 2	Analysis of missing data	54
TABLE 3	Correlation matrix for sub-dimension “Vulnerability and disparities”	55
TABLE 4	Justification of selection of dependent variables for multivariate models	56
TABLE 5	Multivariate models for sub-dimension “Poor infrastructure / harsh environment”	57
TABLE 6A	Final list of indicators – SUB-DIMENSION CHALLENGES I	58
TABLE 6B	Final list of indicators – SUB-DIMENSION CHALLENGES II	59
TABLE 6C	Final list of indicators – SUB-DIMENSION CHALLENGES III	59
TABLE 6D	Final list of indicators – SUB-DIMENSION CAPACITY I	60
TABLE 6E	Final list of indicators – SUB-DIMENSION CAPACITY II	61
TABLE 6F	Final list of indicators – SUB-DIMENSION CAPACITY III	61

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