

# DESIGN FOR THE BASE OF THE PYRAMID: ISSUES AND SOLUTIONS

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Over the past several years, the design and development of products and services for the ‘Base of the Pyramid’ (BoP) markets has been investigated by several authors from different disciplines. A literature review showed that the issues in designing and developing products and services for these markets and ingredients of solutions addressing these issues have not been synthesized. Furthermore, quantitative findings on these issues and solution-ingredients are not available. This paper addresses these gaps by pulling together the issues and solution-ingredients in the BoP from the reviewed literature, and comparing these with a large study found in this literature. In addition, we analyzed the data available in this large study to extract some quantitative findings and to identify relationships between issues and solution-ingredients in the BoP. Our study can be useful not only for businesses intending to tap BoP markets, but also for governments, aid agencies, and practitioners.

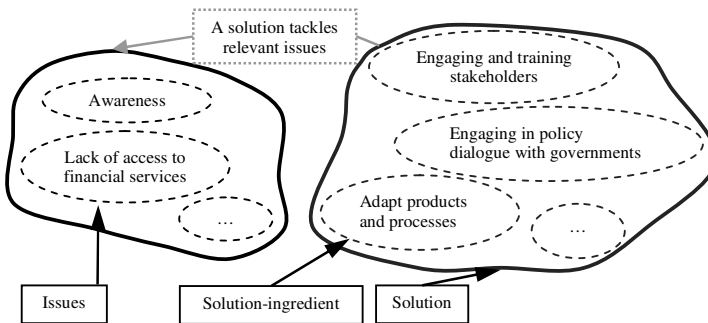
*Keywords:* Design for the Base of the pyramid (DfBoP), Design practice, Sustainability, Issues, Solutions.

## 1. INTRODUCTION

The base of the world economic pyramid, generally called the ‘Base of the Pyramid’ (BoP), consists of four billion people with average per day income of four dollars. Their income is irregular and unpredictable. Most of these people live in rural villages, urban slums, or shantytowns. Usually, these people have little or no formal education, and they are hard to reach via the conventional means of communication and distribution channels.

The reviewed literature presents several cases where businesses have made profits in BoP markets and at the same time helped the poor to satisfy their unmet or under-served needs [1–5]. In order to make profits in BoP markets and to help the poor to satisfy their needs, businesses need to address specific issues in these markets (e.g. lack of physical infrastructure, BoP customers’ inaccessibility to financial services, etc.). Businesses need to be radically innovative to successfully deploy products and services in BoP markets. Henceforth, we use the term product(s) for products and services. A product is a solution, which addresses some relevant issues in the BoP. A solution consists of one or more solution-ingredients (e.g. engaging and training stakeholders in the BoP, engaging in policy dialogue with local governments, etc.). This is illustrated in Figure 1. An in-depth understanding of these issues and solution-ingredients can help businesses in the design and development of products for the BoP. We have used the terms ‘solutions-ingredient(s)’ and ‘ingredient(s)’ interchangeably.

While the research in the BoP domain has been carried out by several authors from different disciplines [6–12], it appears to be fragmented in relation to the issues in the BoP and solution-ingredients addressing these issues. No study in the reviewed literature on the BoP has synthesized and compared these issues and solution-ingredients. Furthermore, quantitative results on these issues and solution-ingredients are not available, and relationships between them have not been investigated. Addressing these gaps in the reviewed literature can be useful in designing and developing products for



**Figure 1.** Illustration of issues, solution, and solution-ingredients.

the BoP, and thereby in gaining profits for businesses and in satisfying the unmet or under-served needs of the poor. Therefore, in this paper, we aim at: (1) synthesizing and comparing issues and solution-ingredients from different studies in the BoP; and (2) gaining quantitative findings on these issues and solution-ingredients (e.g. frequently and less-frequently seen issues and solution-ingredients).

To fulfill our aims, we pulled together issues and solution-ingredients in the BoP from the reviewed literature. We then compared these issues and solution-ingredients with those identified in the study conducted by the United Nations Development Programme (UNDP) [11]. The details regarding this study are presented further in Section 2. We used this UNDP study as a reference because the sample size of cases analyzed in this study is large and these cases are drawn from different sectors such as healthcare, energy, etc. and from different countries. We analyzed the data available in this UNDP study to gain quantitative findings on the issues and solution-ingredients in the BoP.

## 2. SYNTHESIS OF ISSUES AND SOLUTION-INGREDIENTS IN THE BOP

### 2.1. Issues and solution-ingredients from the reviewed literature

Based on the reviewed literature, Table 3.1. summarizes main issues in the design and development of products for the BoP. This table also provides information on the data collection methods used by the authors, and proposed or implemented solution-ingredients to tackle different issues in the BoP.

The UNDP led an initiative called Growing Inclusive Markets. In this initiative, they analysed 50 case studies from ten different sectors such as energy, healthcare, etc. and from different countries [11]. Some part of this UNDP study is reported by Gradl *et al.* [13]. For each of the 50 cases, the UNDP study identified relevant issues considered by the businesses and the solution-ingredients used to address those issues. In the 50 cases, they identified five broader categories of issues and solution-ingredients. These categories are shown in Figure 2. This figure also shows an example of issues and solution-ingredients, identified in one of the 50 case studies (relevant cells are coloured). In this particular case study, the issues addressed are ‘regulatory environment’, ‘physical infrastructure’, and ‘knowledge and skills’. The solution-ingredients employed are: ‘adapt products and processes’ to address the issues ‘physical infrastructure’ and ‘knowledge and skills’; ‘combine resources and capabilities’ to address the issue ‘knowledge and skills’; and ‘engage in policy dialogue with governments’ to address the issue ‘regulatory environment’.

The five broader categories of issues (see Figure 2) are briefly explained as follows.

**Market information:** This issue takes into account the knowledge of businesses regarding the BoP, for example, what the poor need, what capabilities the poor can offer, etc.

**Regulatory environment:** The regulatory frameworks are under–or un–developed in the BoP. In addition, enforcement of the existing rules is inadequate.

**Physical infrastructure:** This issue considers the inadequate infrastructure (e.g. roads, electricity, water and sanitation, hospitals, etc.) in the BoP.

**Table 1.** Issues and solution-ingredients in the BoP.

Author	Data collection method	Main issues considered or identified	Proposed, implemented, or identified solution-ingredients
Anderson and Markides [14]	Field visits, observations, and in-depth interviews	Affordability; availability; acceptability; awareness	—
Keating and Schmidt [15]	Interviews with managers from MNCs	Affordability; market analysis; marketing, sales, and distribution	Strengthening value chain activities with key partnerships; design of products and services; innovative changes to business models
Reza [16]	Experience from implementation of a project in BoP market	Affordability; availability; awareness; economic self-sustainability	Technology adaptation; stakeholder engagement
Richardson and Callegary [17]	Experience from implementation of a project in BoP market	Affordability; availability; accessibility; regulatory frameworks	Engaging and training stakeholders; collaborating with other partners; adapting technology
Skarp <i>et al.</i> [18]	Experience from implementation of a project in BoP market	Affordability; availability; usability; economic self-sustainability	Business management innovation; stakeholder engagement; technological innovation
Prahalad and Hart [5]	Literature review	Affordability; accessibility	Stakeholder engagement; innovation in business models and management processes; empowerment of locals; creating employment opportunities
Karnani [19]	Literature review	Affordability; marketing, sales, and distribution; raising income of the poor	Job creation; creating efficient markets for the products of the poor
UNDP [11]	Case studies	Market information; regulatory environment; physical infrastructure; knowledge and skills; access to financial services	Adapt products and processes; invest in removing market constraints; leverage the strengths of poor; combine resources and capabilities; engage in policy dialogue with governments

		Solution-ingredients				
		Adapt Products and Processes	Invest in Removing Market Constr.	Leverage the Strengths of Poor	Combine Resources and Capabilities	Engage in Dialogue with Gov.
Issues	Market Information					
	Regulatory Environment					
	Physical Infrastructure					
	Knowledge and Skills					
	Access to Financial Services					

**Figure 2.** Issues and solution-ingredients in one of the 50 case studies of the UNDP study.

**Knowledge and skills:** The poor, generally, are illiterate and do not possess knowledge and skills regarding availability of products, usage of products, etc. Furthermore, this lack of knowledge and skills inhibits them from starting their own businesses.

**Access to financial services:** The poor lack access to credits, insurance products, and banking services. This puts limits to the purchases made by them. In addition, they can not protect their meager assets from events such as illness, drought, etc.

The solution-ingredients identified in the UNDP study are briefly explained as follows.

**Adapt products and processes:** This ingredient includes product redesign, business process innovation, and technological adaptation.

**Invest in removing market constraints:** This ingredient includes investing for: educating consumers; enhancing or building capacities of the poor (e.g. supporting small producers who form a part of the supply chain); and building social marketing (e.g. health campaigns to increase demand of malaria nets).

**Leverage the strengths of the poor:** This ingredient builds on the knowledge, networks, and abilities of the poor and their communities (e.g. developing cooperatives of the poor, employing the poor to fulfill some tasks of a business, leveraging the knowledge of the poor to develop products).

**Combine resources and capabilities:** Through collaborations and partnerships, this ingredient combines resources and capabilities of different organizations such as NGOs, financial institutions, local governments, etc.

**Engage in policy dialogue with governments:** Businesses can overcome different issues in the BoP by engaging in dialogue with relevant governments, and this can help, for example, to formulate appropriate regulations, reduce bureaucracy, etc.

## 2.2. Comparison with the UNDP study

The sample size of the case studies, analysed in the UNDP study, is good, and this study has identified main issues and ingredients of solutions in the BoP. In addition, this study analysed cases from different sectors and from different countries. For these reasons, we have compared the issues and solution-ingredients identified in studies listed in Table 3.1. with those from the UNDP study. This comparison was difficult because different authors have used different terms for similar concepts, namely, issues and solution-ingredients. Therefore, we qualitatively compared these issues and solution-ingredients. Table 4.1. presents the summary of this comparison.

The issue ‘market information’ of the UNDP study appears to be similar to the issue ‘market analysis’ identified by Keating and Schmidt [15]. The issue ‘acceptability’ of Anderson and Markides [14] takes into account characteristics (e.g. cultural, socio-economic aspects) of different stakeholders including users in the BoP; and thus this issue is related to the knowledge of businesses regarding the BoP. Therefore, this issue appears to be similar to the ‘market information’ issue of the UNDP study. The issue ‘regulatory environment’ from the UNDP study is highlighted by Richardson and Callegary [17]. The issue ‘physical infrastructure’ of the UNDP study appears to include the issues: ‘availability’ of Anderson and Markides [14], Reza [16], Richardson and Callegary [17], and Skarp *et al.* [18]; ‘accessibility’ of Richardson and Callegary [17], and Prahalad and Hart [5]; and ‘marketing,

**Table 2.** Summary of comparison of the UNDP study and studies in the reviewed literature.

Issues		Solution-ingredients	
UNDP study	Identified by (reference)	UNDP study	Identified by (reference)
Market Information	14, 15	Adapt Products and Processes	5, 15, 17, 18
Regulatory Environment	17	Invest in Removing Market Constraints	17
Physical Infrastructure	5, 14, 15, 16, 17, 18, 19	Leverage the Strengths of Poor	5, 16, 18, 19
Knowledge and Skills	14, 16, 18	Combine Resources and Capabilities	5, 15, 16, 17, 18
Access to Financial Services	5, 14, 15, 16, 17, 18, 19	Engage in Policy Dialogue with Gov.	—

sales, and distribution’ of Keating and Schmidt [15] and Karnani [19]. The issue ‘knowledge and skills’ of the UNDP study appears to include the issues: ‘awareness’ of Anderson and Markides [14] and Reza [16]; and ‘usability’ of Skarp *et al.* [18]. The issue ‘access to financial services’ of the UNDP study appears to include the issues: ‘affordability’ of Anderson and Markides [14], Keating and Schmidt [15], Reza [16], Richardson and Callegary [17], Skarp *et al.* [18], Prahalad and Hart [5], and Karnani [19]. The issue regarding raising income of the poor highlighted by Karnani [19] appears to be similar to the issue ‘access to financial services’ of the UNDP study. This suggests that issues identified by the authors listed in Table 3.1. have been identified by the UNDP study.

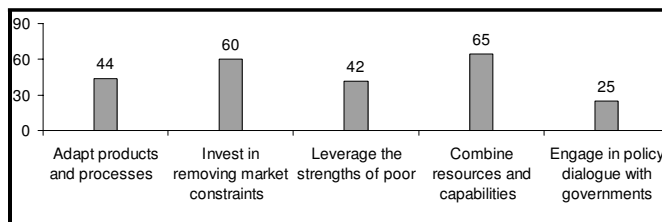
The solution-ingredient ‘adapt products and processes’ of the UNDP study is highlighted by Keating and Schmidt [15], Richardson and Callegary [17], Skarp *et al.* [18], and Prahalad and Hart [5]. The UNDP study’s solution-ingredient ‘invest in removing market constraints’ is considered by Richardson and Callegary [17]. Some aspects of the solution-ingredient ‘leverage the strengths of poor’ of the UNDP study consider the BoP stakeholders as business partners, and thereby this solution-ingredient considers creating jobs for the poor. Creating jobs helps to achieve economic self-sustainability. Therefore, we believe that the solution-ingredient ‘leverage the strengths of poor’ of the UNDP study has been identified by Reza [16], Skarp *et al.* [18], Prahalad and Hart [5], and Karnani [19]. The solution-ingredient ‘combine resources and capabilities’ of the UNDP study appears to consider engagement and partnership of different stakeholders. So, this solution-ingredient is seen in the studies of Keating and Schmidt [15], Reza [16], Richardson and Callegary [17], Skarp *et al.* [18], and Prahalad and Hart [5]. The solution-ingredient ‘engage in policy dialogue with governments’ is not seen in other studies listed in Table 3.1.. Excepting this ingredient, all of the remaining ingredients of the UNDP study are identified by the authors listed in Table 3.1..

The above discussion shows that the issues and solution-ingredients of the UNDP study appear to be comprehensive. This can be attributed to the following facts: the sample size (i.e. 50 case studies) of the UNDP study is large; and the issues and solution-ingredients, identified in their study, are at broader level. However, their study has not identified the relationships between different issues and solution-ingredients. For example, their findings do not reveal answer to the question: what are the prominent solution-ingredients for a given issue in the BoP? In addition, they have not used their data to extract findings such as — frequently addressed issues, frequently employed solution-ingredients, etc. We analysed the data available in the UNDP study to extract these quantitative findings. We analysed data on 48 out of the 50 cases. The data on the remaining two cases was not available on the website of the UNDP study [11].

### 3. QUANTITATIVE FINDINGS

#### 3.1. Solution-ingredients and their relationships with different issues

Figure 3 shows the percentage of solution-ingredients for the 48 cases. A case can have one or more ingredients to address relevant issues in the BoP. Most of the cases include the ingredient ‘combine resources and capabilities’ with 65% of the cases, followed by the ingredient ‘invest in removing market constraint’ with 60% of the cases. The major share of these two ingredients suggests their importance in addressing issues in the BoP.



**Figure 3.** Percentage of 48 cases using different solution-ingredients.

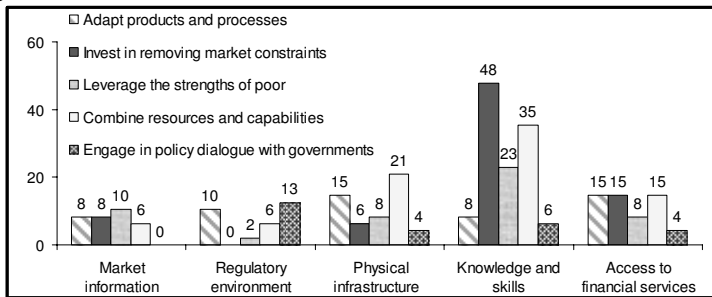


Figure 4. Issues vs. solution-ingredients (% of 48 cases).

The ingredient ‘combine resources and capabilities’ has addressed all of the five issues (see Figure 4). A single business wishing to work in the BoP may not have all the required capabilities and resources to tackle the problems in the BoP. The ingredient ‘combine resources and capabilities’ pulls together the capabilities and resources of different businesses including nontraditional partners (e.g. NGOs, public service providers), and these combined capabilities and resources are effective in addressing different issues in the BoP.

As shown in Figure 4, the ingredient ‘combine resources and capabilities’ is prominently seen in the case of the issues ‘knowledge and skills’ and ‘physical infrastructure’. With the issue ‘physical infrastructure’, the highest percentage (21%) of the cases has considered the ingredient ‘combine resources and capabilities’. This suggests a close relationship between the ingredient ‘combine resources and capabilities’ and the issues ‘physical infrastructure’ and ‘knowledge and skills’. Partnering with the relevant stakeholders such as BoP users, NGOs, etc. appears to be a rational way to address the problems emerging from inadequate infrastructure (e.g. roads, electricity, water, telecommunications network) in the BoP. Collaboration with different stakeholders is effective, for instance, to distribute products, and to make the different stakeholders aware of these products. The ingredient ‘combine resources and capabilities’ is thus closely associated with the issues ‘physical infrastructure’ and ‘knowledge and skills’.

As shown in Figure 4, the ingredient ‘invest in removing market constraint’ addresses four different issues excepting the issue ‘regulatory environment’. The possible reasons for this can be: the functions of this ingredient are not associated with the issue ‘regulatory environment’; and the issue ‘regulatory environment’ is relatively effectively addressed by one or more of other ingredients. The ingredient ‘invest in removing market constraint’ is prominently used to satisfy the issue ‘knowledge and skills’ (48% of the cases). This suggests that this ingredient plays an important role in addressing the issue ‘knowledge and skills’. This can be attributed to the reason that there is a close association between the ingredient ‘invest in removing market constraint’ and the issue ‘knowledge and skills’. The issue ‘knowledge and skills’ takes into account the knowledge and skills of the BoP stakeholders including users, suppliers, distributors, and retailers regarding their specific needs about solutions. Training these stakeholders appears to be an effective method to address the issue ‘knowledge and skills’, and investing to train them to overcome this issue seems to be a rational alternative.

The ingredient ‘adapt products and processes’ is employed to address all of the five issues, and is prominent in the case of the issues ‘physical infrastructure’ and ‘access to financial services’. The ingredient ‘adapt products and processes’ consists of one or both of the sub-ingredients, namely ‘adapt products’ and ‘adapt processes’. We analyzed the cases involving this ingredient with the aim to identify which of the sub-ingredients (i.e. ‘adapt products’ and ‘adapt processes’) are used in those cases. For example, some cases have not used the sub-ingredient ‘adapt products’. Some cases have used both of these sub-ingredients. 21% cases have used the sub-ingredient ‘adapt products’, which is associated with technology (i.e. 79% cases have not used this sub-ingredient). 35% cases have used the sub-ingredient ‘adapt processes’. This suggests that creative use of different ingredients is imperative to address applicable issues in the BoP.

The ingredient ‘leverage the strengths of poor’ is seen in 42% cases, and is prominent in addressing the issues ‘market information’ and ‘knowledge and skills’. This ingredient considers the BoP people as business partners. Businesses use the knowledge and skills of the BoP people to address different issues in the BoP. This ingredient has the highest number of cases in the case of the issue ‘market information’. A possible reason for this is that businesses can easily obtain market information through the BoP people when they are business partners. Furthermore, businesses can use the BoP people as trainers, and thus satisfy the issue ‘knowledge and skills’.

One fourth of the cases have used the ingredient ‘engage in policy dialogue with governments’ (see Figure 3). As the share of this ingredient is small, it is interpreted that this ingredient is uncommon in the BoP. This ingredient has addressed four issues excepting the issue ‘market information’, and is prominent in the case of the issue ‘regulatory environment’ (see Figure 4). This demonstrates a close relationship between the ingredient ‘engage in policy dialogue with governments’ and the issue ‘regulatory environment’. That is, businesses prefer to discuss the relevant regulatory issues with the governments. The ingredient ‘engage in policy dialogue with governments’ has small number of cases addressing the issues — ‘physical infrastructure’, ‘knowledge and skills’, and ‘adapt products and processes’. This shows that businesses have least used policy dialogue with the governments to address these issues. Some of the possible reasons can be: good effectiveness of other ingredients compared to the ingredient ‘engage in policy dialogue with governments’ in addressing these issues; and time delays involved in interacting with and convincing the governments.

### 3.2. Issues and their relationships with different sectors

Figure 5 shows the percentage of cases under the five issues. The issue ‘knowledge and skills’ has frequently been addressed (79% cases) followed by the issues ‘access to financial services’ (44% cases) and ‘physical infrastructure’ (38% cases). This clearly shows the issue ‘knowledge and skills’ is ubiquitous in the BoP. This can be attributed to the prevalent lack of education in the BoP. Although, the field of education appears to be the responsibility of governments, the businesses have generally not used policy dialogue with the governments to address the issues ‘knowledge and skills’ (see Figure 4). Instead, they have prominently used the ingredients ‘invest in removing market constraints’ and ‘combine resources and capabilities’ to address this issue. This can be attributed to the specific needs of businesses regarding the knowledge and skills of BoP stakeholders.

The issues ‘market information’ and ‘regulatory environment’ have been addressed by one fourth of the cases. These issues appear to be uncommon in the BoP. These findings show that businesses ought to identify the issues, which are relevant to their products that are intended for the BoP. These identified issues can be fulfilled by creatively combining different ingredients such as ‘adapt products and processes’, ‘combine resources and capabilities’, etc.

Figure 6 shows issues tackled by businesses in different sectors. The UNDP study has categorized three of the 48 cases in two different sectors. The remaining cases have been categorized under only one sector. In Figure 6, the numbers in the brackets on the horizontal axis show the number of cases under a particular sector. For example, in the case of the sector ‘agriculture and/or food’, the number of cases is 12, and 92% of these 12 cases have considered the issue ‘knowledge and skills’. This issue is seen in all sectors, and therefore this increases our confidence in the abovementioned interpretation

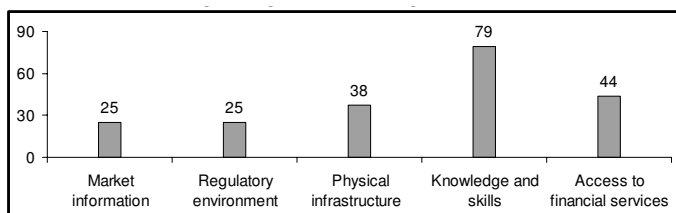


Figure 5. Percentage of 48 cases under different issues.

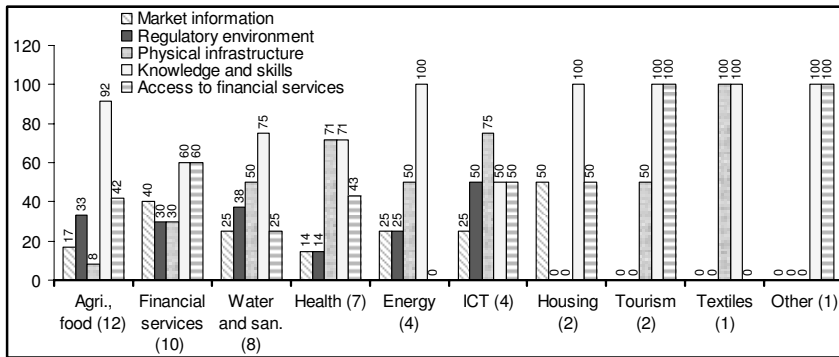


Figure 6. Issues and sectors (% of cases under a given sector).

that this issue is prevalent in the BoP. The number of cases under the sectors, namely, energy, ICT, housing, tourism, textiles, and other, is small; and hence, the findings regarding the issues under these sectors are statistically insignificant. From Figure 6 it is clear that there are differences in percentage of cases considering different issues in various sectors. We therefore interpret that issues addressed by businesses in the BoP depend on the sector. The needs of different stakeholders in the BoP can depend on the sector, for example, the needs of BoP stakeholders in the sector ‘agriculture and/or food’ can be different than those in the sector ‘health’. Therefore, we interpret that issues depend on the needs. This suggests that businesses ought to identify issues relevant to some need(s) in the BoP that they are attempting to satisfy.

#### 4. CONCLUSIONS

To successfully tap BoP markets, it is crucial to gain an in-depth understanding of different issues in designing, developing, and commercializing products in these markets. In this paper, we identified different issues in designing, developing, and commercializing products in BoP markets. We also identified existing solution-ingredients to address these issues.

The issues and solution-ingredients identified in the UNDP study are at a broader level and are derived by analyzing a large sample of case studies from different sectors and countries. Our findings suggest that these issues and solution-ingredients from the UNDP study include those in the reviewed literature. Our analysis of the data from the UNDP study shows that there are associations between some issues and some solution-ingredients; for example, the solution-ingredient ‘invest in removing market constraint’ is prominent in the case of the issue ‘knowledge and skills’, which appears to be ubiquitous in the BoP. These associations may be useful for businesses in designing and developing products in the BoP. It is important to identify issues relevant to some need(s) in the BoP that a business is attempting to satisfy. Similarly, it is crucial to select and creatively combine appropriate solution-ingredients to address the identified issues.

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