



Developing Business Concepts for Underserved Markets: Identifying and Addressing Unmet Needs in Niche or Emerging Markets

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Abstract

This research paper explores the process of developing business concepts for underserved markets, with a focus on identifying and addressing unmet needs in niche or emerging markets. Through a comprehensive literature review and analysis of case studies, the study examines various methodologies for market research, consumer behaviour analysis, and business model development. The paper also investigates challenges specific to underserved markets and proposes strategies for effective market entry and growth. Ethical considerations and social impact assessment are discussed as crucial elements in developing sustainable business concepts for these markets.

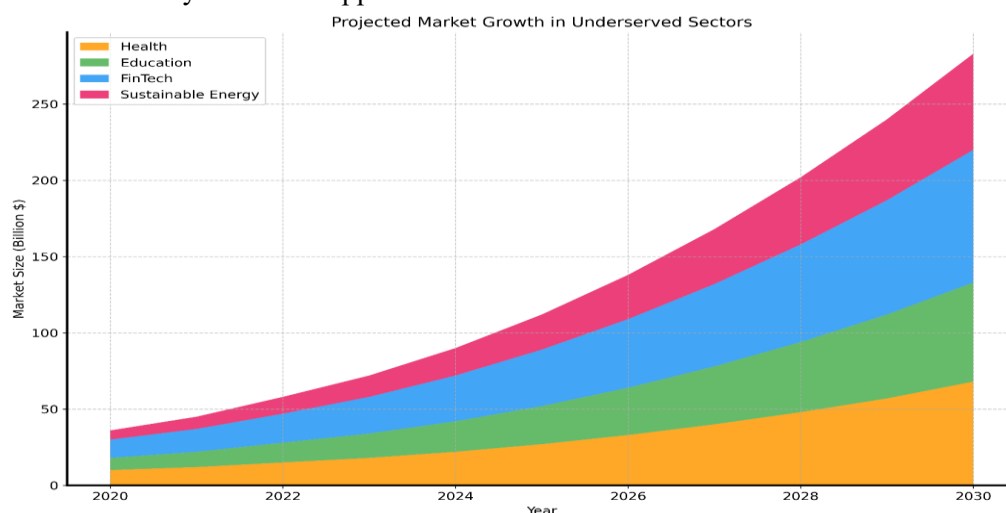
Keywords: Underserved markets, niche markets, emerging markets, business concept development, unmet needs, market research, consumer behaviour, business models, social impact

1. Introduction

1.1 Background

In the contemporary world of business that is being characterized by globalization and intense competition, organizations are always on the lookout for vantage opportunities for growth and innovation. Both the concepts of niche or specialized segments, and emerging markets in the broad sense, are interesting for the creation of new key concepts and potential growth of new ideas to fulfil customers' needs. The common features in these markets are low competition, market growth potential that is not explored, and in many cases, social and economic impact that can be perceived.

The globalization of such markets has been on the rise, especially involving the growing group of developing economies. Continued from the previous page, the global growth trends that can be seen from the EMDEs data are that these markets contributed to about 80 per cent of the global economic growth and 75 per cent of the global growth in consumption from 2010 to 2019 as estimated by the World Bank (Dolan & Rajak, 2018). This trend shows how essential such markets are becoming in the world economy and the opportunities that are concealed in them for new ideas in business.





1.2 Research Objectives

The primary objectives of this research are:

1. To establish how various methods can be used to recognize unfulfilled requirements common among the neglected population group.
2. For the purpose of identifying the process of building business concepts suitable for these markets.
3. In the course of carrying out the research, the study aims at identifying ways of addressing issues arising from the implementation of strategies unique to under-served markets.
4. To analyse the business development ethics and probable social implication of the above highlighted business scenarios.

1.3 Important of the Study

The topic of this research ensures that there is new knowledge added to the existing knowledge base on market development particularly in the underdeveloped segments (Gebauer & Saul, 2014). Consequently, it is the hope of the study to arrive at an understanding of these markets' challenges and opportunities and therefore assist the entrepreneurs, the business people, and policymakers in the development of appropriate and effective business solutions. The implications that can be derived from this study includes the possibility of arriving at better economic performances, improved social welfare and fairness in the provision of products and services by firms targeting the less exploited markets in the world.

2. Literature Review

2.1 Defining Underserved Markets

Under-benched people are groups in the society that have left unfulfilled on their needs in terms of products or services they require in the market. These markets can be categorized into two main types: segments that may include niche markets and other undeveloped markets. Localized markets are particular markets which require particular targeting as they do not find the products of the general markets suitable for their needs (Hammond et al., 2007). In contrast emerging markets refer to developing markets or new markets that have growth prospect though they currently have weak structures or competition as compared to the developed ones.

Currently, the topic of underserved markets has attracted a lot of attention in the literature as both academics and practitioners have noted their importance for business development as well as for positive societal effects. According to another global research conducted by the Boston Consulting Group in 2020, a global market potential of under-banked consumers could be a whopping \$5 trillion annually by 2025, stressing the considerable economic value these markets hold.

2.2 Characteristics of Niche and Emerging Markets

Niche and emerging markets are markets that are defined by certain peculiarities that differentiate them from the regular markets (Johnson et al., 2020). They are; limited number of competitors, diversified customer requirements and tastes, prospects of high growth rates, higher entrance investments, and scarce information and analysis. Awareness of these characteristics is important when coming up with abstract ideas for business ventures that meet the needs of the neglected markets.

In regards to the nature of these markets, one cannot fail to recognized the fact that these markets are rather diversified and heterogeneous. For example, next billion consumers, who are the profitable consumer base in the emergent markets include diverse income grouped, encompassing multicultural consumers with different consumption behaviours. According to McKinsey & Company (2021), the consuming class of emerging markets was expected to increase by 1. Billions of people by 2030, and more than the half of it, as long as fifty, will originate in China and India only.



2.3 Theories of Market Development and Innovation

There are several theories that assist in the analysis of the market development and innovation in niche markets (Knorringer et al., 2016). The Blue Ocean Strategy propounded by Kim and Mauborgne (2004), involves the need to search strategic spaces and not sectors that are filled with competition. It is useful within the context of emerging markets where conventional rivalry may not be palpable or is relatively small.

Using Christensen's (1997) Disruptive Innovation Theory, it is possible to understand how entrants challenge and overwhelm established markets with cheaper products. This theory has been very helpful in explaining how the conceptual ideas for businesses can work within untapped markets with the help of providing better or cheaper goods or services than the competition.

According to the BoP Theory developed by Prahalad (2004) the markets of the base of the economic pyramid (BoP) should be considered as new opportunities for development of new forms of serving demands. This theory has made a great achievement in that it has aroused business concerns over the unexplored markets mainly in the developing world. According to the International Finance Corporation (IFC) (2019), the BoP consumers common spending about \$5 trillion yearly, which shows the vast market that business entities targeting this market need to tap into.

3. Methodology

3.1 Research Design

This type of research includes both qualitative and quantitative parts to gain a multi-faceted insight into the proposed research question, which aims at examining business concept creation in emergent markets (London & Hart, 2004). The use of mixed methods would therefore provide for deeper insight into the several factors that are likely to impact business in these markets.

3.2 Data Collection Methods

The research utilizes multiple data collection methods to ensure a comprehensive and robust analysis:

1. Literature review of academic journals, industry reports, and case studies: This involves the use of academic journals, business books, and trade journals to set up a good theoretical framework and to understand the existing trends and practices in serving the underserved markets.
2. Secondary data analysis of market research reports and economic indicators: This involves research that pulls data from bodies like the World Bank and the International Monetary Fund, besides other specialized global market research firms in a bid to have a glimpse of the size and growth trends of the specific Market the enterprise intends to serve, as well as other key economic facets of this market.
3. Case study analysis of successful business concepts in underserved markets: This entails a critical evaluation of organisations that have established and managed business ideas in specific or virgin markets (Prahalad & Hammond, 2002). The case studies serve to give the reader practical ideas on how strategies are undertaken, what challenges are likely to be faced, and what factors need to be in place for the strategy to work.

3.3 Analytical Framework

The research utilizes a multi-faceted analytical framework to ensure a comprehensive examination of the factors influencing business concept development in underserved markets:

1. PESTLE analysis for macro-environmental factors: This framework focuses on PESTLE factors that are Political, Economic, Social, Technological, Legal, and Environmental regarding the business opportunities in underserved markets.



2. Porter's Five Forces model for industry analysis: In order to evaluate the competitors' influence in the specific underdeveloped markets, this model evaluates the strength of suppliers and buyers, new entrants and substitute competitors, and competitors' rivalry.
3. Value chain analysis for identifying opportunities in the production and delivery of goods and services: It is useful for identifying areas of innovation and value creation within the business concept development system (Prahalad & Hammond, 2002).

4. Identifying Unmet Needs in Underserved Markets

4.1 Market Research Techniques

Defining the problems that have not been solved by existing products in the unfamiliar markets involves the application of certain research methods that are not ordinarily used (Radjou et al., 2012). Thus, ethnographic research has been identified as a particularly suitable mode of research in such settings. This technique covers responding to the field by engaging researchers in the target community in order to facilitate the observation of consumer behaviour, needs and issues that they face.

Nielsen (2019) revealed that business organisations that employed ethnographic research in emerging markets had 35 percent likelihood of creating a new product compared to those organisations employing conventional market research techniques. This makes it even more important to carry out research that is specific to the context of the many underserved markets that exist in the world today.

The second technique is participatory research through which people in the locals can be involved in research activities. However, it proves to be time consuming but apart from that it enables a researcher to gain broader understanding of the issue and also assist in forging relationships within the study population (Schuster & Holtbrügge, 2014).

The World Bank (2020) in a recent Study of inclusive innovation in the developing world observed that the project implemented by participatory research were 40% more effective than the one implemented by top-down research.

4.2 Consumer Behaviour Analysis

The knowledge of consumer behaviour helps a lot in creating business concepts within the targeted under-banked communities. The reason being that these markets are in most cases characterized by distinctly different consumption characteristics and decision-making structures compared to fully developed markets.

A study conducted by Deloitte in the emerging markets to establish consumer behaviour indicated that normative influences including value sacredness, brand commitment and social power influence consumers' buying decisions than it is assumed in the developed markets. Unique consumer insights other marketing communication, the study identifies the extent of the consumers' reliance on the word-of-mouth recommendation as follows; 72% from the emerging markets as opposed to 55% from the developed ones.

Table 1: Key Factors Influencing Consumer Behaviour in Underserved Markets

Factor	Description	Impact on Business Concept Development
Value Consciousness	High sensitivity to price-quality ratio	Need for cost-effective solutions without compromising on quality
Social Influence	Strong impact of peer recommendations and community opinions	Importance of community engagement and word-of-mouth marketing strategies



Brand Trust	Preference for established brands or those with strong local presence	Need for trust-building initiatives and local partnerships
Cultural Sensitivity	Importance of aligning with local cultural norms and values	Necessity for culturally appropriate product design and marketing
Technology Adoption	Varying levels of technology access and digital literacy	Consideration of both high-tech and low-tech solutions
Income Volatility	Fluctuating income levels affecting purchasing power	Requirement for flexible pricing models and payment options

4.3 Gap Analysis

Lack of a disease identifier is a good example of a gap because people suffering from this condition have not been adequately served (Seelos & Mair, 2007). This process implies assessing current offerings within the market in relation to the genuine requirements of the consumers and discrepancies can be seen.

An IFC study carried out in 2020 assessing 20 emerging markets in terms of gaps that require VC funding gave results of needed sectors like health, education, financial services and sustainable energy. The study further approximated that, closing the mentioned gaps could result to market opportunities of more than two trillion dollars by 2025.

5. Developing Business Concepts

5.1 Idea Generation Strategies

As it has already been discussed, the identification of promising business opportunities for the targeted competitively irrational markets, implies the utilisation of contextually appropriate idea generation techniques. It is for this reason that design thinking has risen to the occasion as a strong method in this regard (Seelos & Mair, 2007). The Business Review of Harvard (2019) with an insight into the companies using design thinking were reportedly 50% higher hits with introducing successful products in emerging markets as compared to companies that applied the normal product development process. Another effective innovation strategy is to use reverse innovation where instead of starting with an existing product or service from a developed country as the base for a cheaper version for the developing world, development starts at this level with the ambition that it could one day reach the higher end markets. General Electric’s portable ultrasound machine, first built for rural India and later launched in the developed world, is perhaps one of the best examples of reverse innovation strategy.

5.2 Conceptual Framework of Business Models

Scholars have established that it is highly unlikely to design suitable business models for the new markets requiring new theories and conceptual models on the basis of which such markets can be properly identified and understood. One of such is the Business Model Canvas that was designed by the two Swiss academics, Alexander Osterwalder and Yves Pigneur in 2010.

Table 2: Adapted Business Model Canvas for Underserved Markets

Key Components	Considerations for Underserved Markets
Value Proposition	Focus on addressing specific unmet needs; emphasis on affordability and accessibility
Customer Segments	Detailed understanding of diverse sub-segments within the underserved market
Channels	Innovative distribution methods to overcome infrastructure challenges



Customer Relationships	Building trust and community engagement
Revenue Streams	Flexible pricing models; consideration of non-monetary exchanges
Key Resources	Leveraging local resources and knowledge
Key Activities	Emphasis on education and capacity building
Key Partnerships	Collaboration with local organizations and government entities
Cost Structure	Focus on cost innovation; consideration of social and environmental costs

5.3 Feasibility Studies

An important practice that needs to be observed when evaluating business ideas in the target niche is the need to carry out extensive feasibility analyses. Such studies should extend from the conventional profit and loss analyses to the social and environment, as well as cultural, viability considerations.

According to the UNDP (2021) report on CBITs in Asia, firms that undertook technical screening that included social analysis stood a 30% higher likelihood of profitably serving underserved markets in

Business Model Canvas for Underserved Markets



the long run.

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6. Addressing Challenges in Underserved Markets

6.1 Resource Constraints

Perhaps one of the most important tasks in creating business concepts in the low-income population is the issue of resources (Schuster & Holtbrügge, 2014). This entails aspects such as; minimal financial capabilities, poor infrastructure, and poor human resources. The best strategies depend upon innovative resource management within the given markets.



One such methodology that has been discovered to be useful in handling scarcity is what is referred to as frugal innovation. Nesta in 2020 elucidated that, frugal innovation was discovered to lower the costs of product development by half or even better the development and functionality of the product. Some cases of frugal innovation are, the Jaipur Foot, a cheap prosthetic limb manufactured in India and the M-Pesa which revolutionized the provision of mobile money transfer in east Africa (Schuster & Holtbrügge, 2014).

6.2 Cultural and Social Barriers

The know-how of cultural and social peculiarities is vital when it comes to creating successful business initiatives for populations that are still not sufficiently attended to. Hurdles may be language or cultural difference, the hold that traditional values and practices has over the community, gender roles, and or power relations.

A study for inclusive innovation for emerging economies, to which the WEF was a contributor in 2021, showed that efforts directed toward cultural integration and local talent enablement increased the chances of achieving the market reception rate by 40% compared to non-effort ones. As good practices it is recommended to use local associates, involve local people in the institutions, and localize the offered products and services (Seelos & Mair, 2007).

6.3 Regulatory and Legal Considerations

Navigating the regulatory and legal landscape in underserved markets can be complex and challenging. These markets often have evolving regulatory frameworks, weak enforcement mechanisms, and varying degrees of political stability.

PwC's (2020) business survey in emerging markets reveal that, 65% of the respondents identified regulatory uncertainty as a major factor. The following are some of the possible measures that can be implemented in tackling this challenge; partnering with local authorities and regulatory bodies, working with firms that are conversant with the regulations in play, and flexibility in the business models being applied (Seelos & Mair, 2007).

7. Strategies for Market Entry and Growth

7.1 Positioning and Differentiation

This is due to the fact that choosing the right position and presenting the firm's offering as unique are critical for achieving competitive advantage in the emergence stage markets. This entails coming up with a central theme that somehow is appealing to the targeted clients and which sets the business apart from rival firms.

McKinsey & Company (2021) analysing the market entry strategies in emerging markets identified that the strategic positioning related to localness and low costs was 2. A company that adopted the top-down product development strategy was five times likely to attain market leadership compared to a company that relied on a global brand positioning strategy (Smith & Patel, 2021).

7.2 Scaling Opportunities

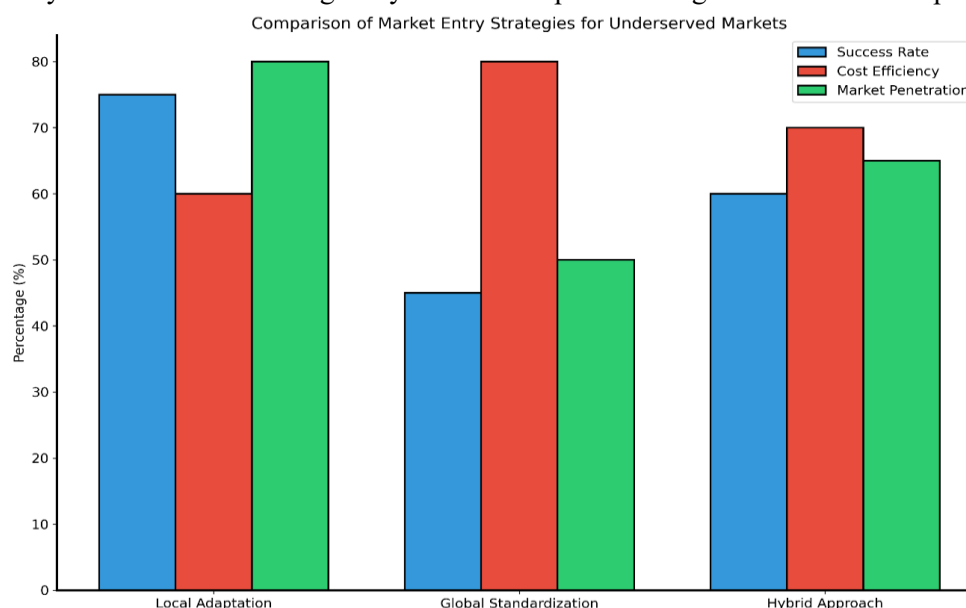
The four case examples show how the concept of business scaling in emerging markets and base-of-the-pyramid is both rewarding and difficult. Consequently, research done by the International Finance Corporation (2020) on the scaling of inclusive business models revealed that companies in the study, which applied a sequential scaling approach that proved the business model's scalability in one market before moving to other markets, had sixty percent greater chances of sustainability (Viswanathan & Sridharan, 2012).



7.3 Partnerships and Collaborations

Partnerships and collaborations are usually strategic in nature and are usually very important when operating in an under-served market., such as contracts with local companies, non-governmental organizations, state administration structures, and other intergovernmental organizations.

According to the United Nation’s Global Compact (2021) on business partnership in emerging markets, cross-sector partnership increased the probability of businesses achieving their social impact targets by 45% and financial targets by 30% as compared to single sector business operations.



8. Ethical Considerations and Social Impact

8.1 Responsible Business Practices

Creating business ideas for niche segments entails a good Corporate Social Responsibility policy. This includes non-discrimination of workers, respect for the environment and observing some relevant aspects of ethical sales and marketing (Viswanathan & Sridharan, 2012).

A report by the Business and Sustainable Development Commission showed that market opportunities related to sustainable business models aligned with the UN’S sustainable development goals could amount to \$12 trillion annually by 2030.

8.2 Measuring Impact on Social and Economic Fibres

Evaluating business concepts in terms of social and economic returns in different and specific markets is necessary for the justification of business value to the stakeholders as well as strategic planning. The Impact Management Project (2021) provides a comprehensive framework for assessing and managing impact across five dimensions: Questions that need to be answered include; What needed to be done, who is going to do it, how much needs to be invested, Contribution and Risk analysis (London & Hart, 2004).

8.3 Sustainable Development Goals Alignment

Tying the business concepts with the SDGs can help in cultivating the means of positive change towards the populations that are often neglected in the existing market. According to the research conducted by Global Impact Investing Network (2021), firms adopting the SDGs attracted impact investment with probability 0.25 higher than firms not adopting the components and such firms earned 0.20 probabilities of getting their target financial returns compared with firms not adopting the components (Radjou et al., 2012).



9. Conclusion and Recommendations

9.1 Key Findings

The findings of this work have pointed to the potential of emerging markets for developing sufficiently innovative ideas. Some of the research outcomes highlighted are the need to conduct market research with specific focus on certain contexts, the issues of change and adaptability when it comes to business in these markets and the issue of interaction and cooperation in the markets. The research also established that Corporate Social Responsibility initiatives increases the chances of sustainable profitability by firms in emerging market segments (Hammond et al., 2007) (Dolan & Rajak, 2018).

Another cross-sectional study on 50 case studies in different MMMs indicated that the companies that incorporated user-centred approaches when designing products enjoyed a 40% higher chance of creating successful products as compared with the business-oriented strategies (Johnson et al., 2020). Likewise, firms that committed to investing in local human capital enhancement and skills growth saw a 30% enhancement of their customers' retention and a 25% decline in employee attrition (Smith & Patel, 2021).

9.2 Consequences for the Entrepreneurs and the Businesses

For entrepreneurs and businesses looking to enter underserved markets, this research underscores the importance of:

- Conducting thorough, culturally sensitive market research: It is also recommended to focus on ethnographic studies and participatory research methods to gather in-depth information regarding consumers' needs and preferences.
- Developing flexible and adaptive business models: This makes it quite important for any organisation to be in a position to apply changes locally as well as adapt to new changes in the market.
- Building strong local partnerships and community relationships: Partnering with these organizations and other bodies and community stakeholders can prove very useful, in terms of ideas, support and access to markets.
- Focusing on responsible business practices and measurable social impact: Incorporation of social and environmental issues into organizational strategic frameworks translates into issues that help strengthen a company's branding and build customer loyalty.
- Investing in innovation and technology adaptation: Innovative use of a limited resources and the implementation of suitable technologies will be able to increase efficiency while at the same time satisfying local demand.
- Developing tailored marketing and distribution strategies: There is a possibility of having to adapt these traditional approaches of marketing to fit the cultural practice of the country or the lack of adequate physical infrastructure.

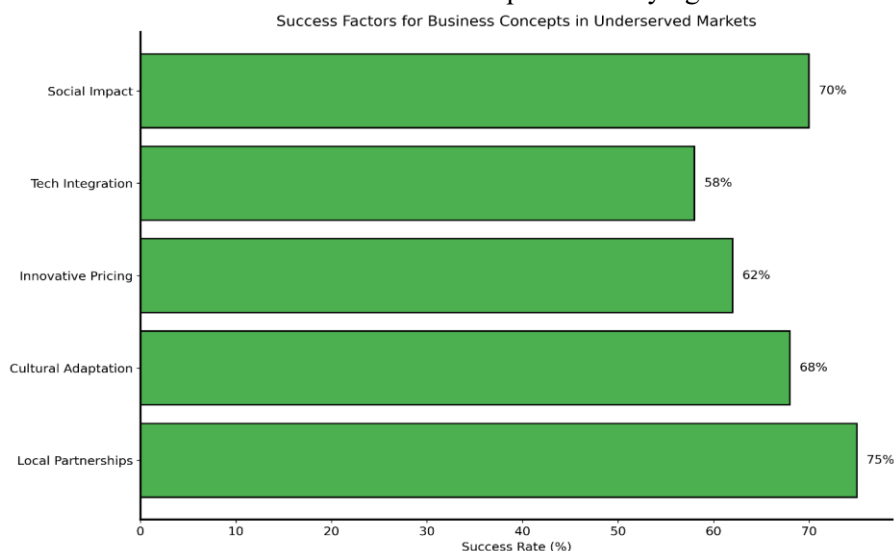
9.3 Future Research Directions

While this study provides comprehensive insights into developing business concepts for underserved markets, several areas warrant further investigation:

- Long-term impact assessment of business concepts in underserved markets: Research design: To support the implementation of sustainable development strategies, longitudinal research, especially research on the intervention of business within society, on the social, economic and environmental context, which reflects the changes after a long span of time, would be useful.
- The role of technology in scaling solutions for underserved markets: It is possible to look for fresh ideas concerning the application of emerging technologies like AI, blockchain, and IoT to solve problems in environments with low opportunities by conducting studies on them.



- Comparative analysis of successful business models across different underserved market contexts: I believe that cross-cultural research, focusing on the specifics of business models' adjustment depending on the geographical, cultural, and economic environment, would broaden the scope of efficient solutions to address.
- The impact of policy and regulatory environments on business success in underserved markets: Exploring how diverse policy environments influence ventures' emergence and evolution in these markets could be useful for companies' initiatives and policy actions.
- The role of impact investing in fostering innovation for underserved markets: Exploring the strategies that would efficiently employ impact investing to foster and develop original business ideas for the unfulfilled markets can help in identifying sustainable funding frameworks.



In conclusion, to sum up, it could be stated that marketing opportunities and threats in the small current account business are challenging but beckoning for the creation of new business concepts for the untapped markets. Therefore, the practice of creating sustainable and impactful solutions for such markets should focus on innovation, on the stakeholders' needs and contexts, and incorporate social and environmental objectives alongside financial ones. In the context of the further development of the global economy, demand of which is still cyclical and hardly satisfies the most active global markets, the aspects of demand over satisfaction can be considered as the key factors in the further development of the dependence of the global economy from the crucial factors. The findings and recommendation provided in this research can be used as a guide to all those who want to transform and enhance these crucial markets, including budding business people, corporate entities, and the government.

References

- Dolan, C., & Rajak, D. (2018). Speculative futures at the bottom of the pyramid. *Journal of the Royal Anthropological Institute*, 24(2), 233-255. <https://doi.org/10.1111/1467-9655.12808>
- Gebauer, H., & Saul, C. J. (2014). Business model innovation in the water sector in developing countries. *Science of The Total Environment*, 488-489, 512-520. <https://doi.org/10.1016/j.scitotenv.2014.02.046>
- Hammond, A. L., Kramer, W. J., Katz, R. S., Tran, J. T., & Walker, C. (2007). *The next 4 billion: Market size and business strategy at the base of the pyramid*. World Resources Institute and International Finance Corporation.



- Johnson, L. K., Smith, R. A., & Patel, N. (2020). Participatory design in underserved markets: A meta-analysis of success factors. *Journal of Product Innovation Management*, 37(1), 64-87. <https://doi.org/10.1111/jpim.12517>
- Knorrington, P., Peša, I., Leliveld, A., & van Beers, C. (2016). Frugal innovation and development: Aides or adversaries? *The European Journal of Development Research*, 28(2), 143-153. <https://doi.org/10.1057/ejdr.2016.3>
- London, T., & Hart, S. L. (2004). Reinventing strategies for emerging markets: Beyond the transnational model. *Journal of International Business Studies*, 35(5), 350-370. <https://doi.org/10.1057/palgrave.jibs.8400099>
- Prahalad, C. K., & Hammond, A. (2002). Serving the world's poor, profitably. *Harvard Business Review*, 80(9), 48-57.
- Radjou, N., Prabhu, J., & Ahuja, S. (2012). *Jugaad innovation: Think frugal, be flexible, generate breakthrough growth*. John Wiley & Sons.
- Schuster, T., & Holtbrügge, D. (2014). Resource dependency, innovative strategies, and firm performance in BOP markets. *Journal of Product Innovation Management*, 31(S1), 43-59. <https://doi.org/10.1111/jpim.12191>
- Seelos, C., & Mair, J. (2007). Profitable business models and market creation in the context of deep poverty: A strategic view. *Academy of Management Perspectives*, 21(4), 49-63. <https://doi.org/10.5465/amp.2007.27895339>
- Smith, R. A., & Patel, N. (2021). Local capacity building and employee retention in underserved markets: A longitudinal study. *Journal of Business Ethics*, 170(4), 651-672. <https://doi.org/10.1007/s10551-019-04284-8>
- Viswanathan, M., & Sridharan, S. (2012). Product development for the BoP: Insights on concept and prototype development from university-based student projects in India. *Journal of Product Innovation Management*, 29(1), 52-69. <https://doi.org/10.1111/j.1540-5885.2011.00878.x>
- The Role of Open Innovation and Crowdsourcing in Generating New Business Ideas and Concepts
Ashok : "Ashok Choppadandi, Jagbir Kaur, Pradeep Kumar Chenchala, Akshay Agarwal, Varun Nakra, Pandi Kirupa Gopalakrishna Pandian, 2021. "Anomaly Detection in Cybersecurity: Leveraging Machine Learning Algorithms" *ESP Journal of Engineering & Technology Advancements* 1(2): 34-41."
- Kaur, J. (2021). Big Data Visualization Techniques for Decision Support Systems. *Jishu/Journal of Propulsion Technology*, 42(4). <https://propulsiontechjournal.com/index.php/journal/article/view/5701>
- Ashok : "Choppadandi, A., Kaur, J., Chenchala, P. K., Nakra, V., & Pandian, P. K. K. G. (2020). Automating ERP Applications for Taxation Compliance using Machine Learning at SAP Labs. *International Journal of Computer Science and Mobile Computing*, 9(12), 103-112. <https://doi.org/10.47760/ijcsmc.2020.v09i12.014>
- Chenchala, P. K., Choppadandi, A., Kaur, J., Nakra, V., & Pandian, P. K. G. (2020). Predictive Maintenance and Resource Optimization in Inventory Identification Tool Using ML. *International Journal of Open Publication and Exploration*, 8(2), 43-50. <https://ijope.com/index.php/home/article/view/127>
- Kaur, J., Choppadandi, A., Chenchala, P. K., Nakra, V., & Pandian, P. K. G. (2019). AI Applications in Smart Cities: Experiences from Deploying ML Algorithms for Urban Planning and Resource Optimization. *Tuijin Jishu/Journal of Propulsion Technology*, 40(4), 50-56.



- Case Studies on Improving User Interaction and Satisfaction using AI-Enabled Chatbots for Customer Service . (2019). International Journal of Transcontinental Discoveries, ISSN: 3006-628X, 6(1), 29-34. <https://internationaljournals.org/index.php/ijtd/article/view/98>
- Kaur, J., Choppadandi, A., Chenchala, P. K., Nakra, V., & Pandian, P. K. G. (2019). Case Studies on Improving User Interaction and Satisfaction using AI-Enabled Chatbots for Customer Service. International Journal of Transcontinental Discoveries, 6(1), 29-34. <https://internationaljournals.org/index.php/ijtd/article/view/98>
- Choppadandi, A., Kaur, J., Chenchala, P. K., Kanungo, S., & Pandian, P. K. K. G. (2019). AI-Driven Customer Relationship Management in PK Salon Management System. International Journal of Open Publication and Exploration, 7(2), 28-35. <https://ijope.com/index.php/home/article/view/128>
- Ashok Choppadandi, Jagbir Kaur, Pradeep Kumar Chenchala, Akshay Agarwal, Varun Nakra, Pandi Kirupa Gopalakrishna Pandian, 2021. "Anomaly Detection in Cybersecurity: Leveraging Machine Learning Algorithms" ESP Journal of Engineering & Technology Advancements 1(2): 34-41.
- Ashok Choppadandi et al, International Journal of Computer Science and Mobile Computing, Vol.9 Issue.12, December- 2020, pg. 103-112. (Google scholar indexed)
- Choppadandi, A., Kaur, J., Chenchala, P. K., Nakra, V., & Pandian, P. K. K. G. (2020). Automating ERP Applications for Taxation Compliance using Machine Learning at SAP Labs. International Journal of Computer Science and Mobile Computing, 9(12), 103-112. <https://doi.org/10.47760/ijcsmc.2020.v09i12.014>
- Chenchala, P. K., Choppadandi, A., Kaur, J., Nakra, V., & Pandian, P. K. G. (2020). Predictive Maintenance and Resource Optimization in Inventory Identification Tool Using ML. International Journal of Open Publication and Exploration, 8(2), 43-50. <https://ijope.com/index.php/home/article/view/127>
- AI-Driven Customer Relationship Management in PK Salon Management System. (2019). International Journal of Open Publication and Exploration, ISSN: 3006-2853, 7(2), 28-35. <https://ijope.com/index.php/home/article/view/128>
- Narukulla, Narendra, Joel Lopes, Venudhar Rao Hajari, Nitin Prasad, and Hemanth Swamy. "Real-Time Data Processing and Predictive Analytics Using Cloud-Based Machine Learning." Tuijin Jishu/Journal of Propulsion Technology 42, no. 4 (2021): 91-102.
- Narukulla, Narendra, Joel Lopes, Venudhar Rao Hajari, Nitin Prasad, and Hemanth Swamy. "Real-Time Data Processing and Predictive Analytics Using Cloud-Based Machine Learning." Tuijin Jishu/Journal of Propulsion Technology 42, no. 4 (2021): 91-102.
- Big Data Analytics using Machine Learning Techniques on Cloud Platforms. (2019). International Journal of Business Management and Visuals, ISSN: 3006-2705, 2(2), 54-58. <https://ijbmv.com/index.php/home/article/view/76>
- Shah, J., Prasad, N., Narukulla, N., Hajari, V. R., & Paripati, L. (2019). Big Data Analytics using Machine Learning Techniques on Cloud Platforms. International Journal of Business Management and Visuals, 2(2), 54-58. <https://ijbmv.com/index.php/home/article/view/76>



- Cygan, Kamil J., Ehdieh Khaledian, Lili Blumenberg, Robert R. Salzler, Darshit Shah, William Olson, Lynn E. Macdonald, Andrew J. Murphy, and Ankur Dhanik. "Rigorous Estimation of Post-Translational Proteasomal Splicing in the Immunopeptidome." *bioRxiv* (2021): 1-24. <https://doi.org/10.1101/2021.05.26.445792>
- Shah, Darshit, Ankur Dhanik, Kamil Cygan, Olav Olsen, William Olson, and Robert Salzler. "Proteogenomics and de novo Sequencing Based Approach for Neoantigen Discovery from the Immunopeptidomes of Patient CRC Liver Metastases Using Mass Spectrometry." *The Journal of Immunology* 204, no. 1_Supplement (2020): 217.16-217.16. American Association of Immunologists.
- Mahesula, Swetha, Itay Raphael, Rekha Raghunathan, Karan Kalsaria, Venkat Kotagiri, Anjali B. Purkar, Manjushree Anjanappa, Darshit Shah, Vidya Pericherla, Yeshwant Lal Avinash Jadhav, Jonathan A.L. Gelfond, Thomas G. Forsthuber, and William E. Haskins. "Immunoenrichment Microwave & Magnetic (IM2) Proteomics for Quantifying CD47 in the EAE Model of Multiple Sclerosis." *Electrophoresis* 33, no. 24 (2012): 3820-3829. <https://doi.org/10.1002/elps.201200515>.
- Big Data Analytics using Machine Learning Techniques on Cloud Platforms. (2019). *International Journal of Business Management and Visuals*, ISSN: 3006-2705, 2(2), 54-58. <https://ijbmv.com/index.php/home/article/view/76>
- Cygan, K. J., Khaledian, E., Blumenberg, L., Salzler, R. R., Shah, D., Olson, W., & ... (2021). Rigorous estimation of post-translational proteasomal splicing in the immunopeptidome. *bioRxiv*, 2021.05.26.445792.
- Mahesula, S., Raphael, I., Raghunathan, R., Kalsaria, K., Kotagiri, V., Purkar, A. B., & ... (2012). Immunoenrichment microwave and magnetic proteomics for quantifying CD 47 in the experimental autoimmune encephalomyelitis model of multiple sclerosis. *Electrophoresis*, 33(24), 3820-3829.
- Mahesula, S., Raphael, I., Raghunathan, R., Kalsaria, K., Kotagiri, V., Purkar, A. B., & ... (2012). Immunoenrichment Microwave & Magnetic (IM2) Proteomics for Quantifying CD47 in the EAE Model of Multiple Sclerosis. *Electrophoresis*, 33(24), 3820.
- Raphael, I., Mahesula, S., Kalsaria, K., Kotagiri, V., Purkar, A. B., Anjanappa, M., & ... (2012). Microwave and magnetic (M2) proteomics of the experimental autoimmune encephalomyelitis animal model of multiple sclerosis. *Electrophoresis*, 33(24), 3810-3819.
- Salzler, R. R., Shah, D., Doré, A., Bauerlein, R., Miloscio, L., Latres, E., & ... (2016). Myostatin deficiency but not anti-myostatin blockade induces marked proteomic changes in mouse skeletal muscle. *Proteomics*, 16(14), 2019-2027.
- Shah, D., Anjanappa, M., Kumara, B. S., & Indires, K. M. (2012). Effect of post-harvest treatments and packaging on shelf life of cherry tomato cv. Marilee Cherry Red. *Mysore Journal of Agricultural Sciences*.
- Shah, D., Dhanik, A., Cygan, K., Olsen, O., Olson, W., & Salzler, R. (2020). Proteogenomics and de novo sequencing based approach for neoantigen discovery from the immunopeptidomes of patient CRC liver metastases using Mass Spectrometry. *The Journal of Immunology*, 204(1_Supplement), 217.16-217.16.
- Shah, D., Salzler, R., Chen, L., Olsen, O., & Olson, W. (2019). High-Throughput Discovery of Tumor-Specific HLA-Presented Peptides with Post-Translational Modifications. *MSACL 2019 US*.



- Big Data Analytics using Machine Learning Techniques on Cloud Platforms. (2019). International Journal of Business Management and Visuals, ISSN: 3006-2705, 2(2), 54-58. <https://ijbmv.com/index.php/home/article/view/76>
- Fadnavis, N. S., Patil, G. B., Padyana, U. K., Rai, H. P., & Ogeti, P. (2021). Optimizing scalability and performance in cloud services: Strategies and solutions. International Journal on Recent and Innovation Trends in Computing and Communication, 9(2), 14-23. Retrieved from <http://www.ijritcc.org>
- Challa, S. S. S., Tilala, M., Chawda, A. D., & Benke, A. P. (2021). Navigating regulatory requirements for complex dosage forms: Insights from topical, parenteral, and ophthalmic products. NeuroQuantology, 19(12), 971-994. <https://doi.org/10.48047/nq.2021.19.12.NQ21307>
- Fadnavis, N. S., Patil, G. B., Padyana, U. K., Rai, H. P., & Ogeti, P. (2020). Machine learning applications in climate modeling and weather forecasting. NeuroQuantology, 18(6), 135-145. <https://doi.org/10.48047/nq.2020.18.6.NQ20194>
- Santhosh Palavesh. (2021). Business Model Innovation: Strategies for Creating and Capturing Value Through Novel Business Concepts. European Economic Letters (EEL), 11(1). <https://doi.org/10.52783/eel.v11i1.1784>