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Defining frugal innovation: a critical review

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ABSTRACT

Frugal innovation (FI), which has gained traction in various sectors, is loosely defined as developing quality solutions in a resource-constrained environment that are affordable to low-income consumers. However, with its popularity, multiple and diverse definitions have emerged that often lack a theoretical foundation. This has led to a convoluted conceptualisation that hinders research and adoption in practice. Despite this plethora of perspectives and definitions, scholars do agree that there is a need for a unified definition. This critical review across the management, entrepreneurship, business and organisation studies literatures explores the multiple definitions of FI that have appeared in the last two decades and seeks to examine the commonalities and differences. One definition is supported by a theoretical underpinning, and main themes include affordability, adaptability, resource scarcity, accessibility and sustainability, however, there remains significant ambiguity around what constitutes an FI. Defining FI as a concept should not deter from focusing on its core aim and identifying an FI may be best achieved by comparing it to an incumbent alternative, rather than against an ill-defined concept. There is merit in developing a common understanding of FI to support strategies for its successful acceptance and diffusion globally.

INTRODUCTION

Since its introduction in *The Economist* (2010), frugal innovation (FI) has gained traction in various sectors such as healthcare, manufacturing, food, automotive, energy and academia across the world.¹⁻⁴ But with its popularity, multiple definitions have also developed, depicted mostly through case studies and lacking in a grounded conceptual basis or a theoretical foundation.^{3 5-8} FI is not a new strategy but is a flexible approach to thinking about repurposing

Summary box

What is already known?

- ▶ Frugal innovation (FI) is ill defined and is synonymous with numerous innovation types such as jugaad, bricolage, disruptive, cost and grass roots innovation.
- ▶ The premise of FI is essentially to develop quality and affordable solutions in resource-constrained environments for low-income consumers.
- ▶ Since its introduction and with its growing popularity, a plethora of definitions and descriptions have been developed often supported by conceptual and case studies thus lacking a theoretical underpinning.

What are the new findings?

- ▶ Various definitions share many overlapping characteristics such as affordability, functionality, resource-scarcity, accessibility and sustainability.
- ▶ Conceptualising FI should not deter from focusing on its core aim. Identifying an FI may be best achieved by comparing it to an incumbent alternative, rather than against an ill-defined concept.
- ▶ A common understanding of FI will add significant value to research and practice.

and sustainable resourcing.⁹ Coupled with reduced government spending, reducing incomes and limited budgets, it has recently also caught the attention of developed markets.^{10 11} Protagonists view it as an entrepreneurial mindset, having the ability to develop innovative solutions using limited resources for underserved consumers typically in low-income to middle-income countries (LMICs). In this perspective, FI can create new markets and contribute towards a more sustainable and inclusive world by supporting a more circular economy. In contrast, others may view FI as a cheaper and ineffective solution to a temporary problem as aspirations for ‘bigger and better’ are ever-growing.¹² In this review, we explore



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FI definitions across the business, management, entrepreneurship and organisation behaviour literatures, we compare and contrast the many perspectives of FI, provide a synthesis of its core features and make suggestions for policy and practice.

DEFINING FI

The increasing interest in FI has led to a wide array of criteria^{11 13–15} and conceptualisations.^{4 12 16 17} It is often defined by its similarities and differences with other types of innovation,^{18–20} through case study research in different markets^{10 21} and its relationship with sustainability and other core principles such as cost and adaptability,^{4 22 23} (see table 1). There is consensus about the lack of transparency and clarity in defining FI and what constitutes an FI.²⁴ At present, there is no standard definition of FI which may be in part due to the various terminologies such as jugaad,²⁵ reverse innovation,²⁶ Ghandian,¹⁵ shanzhai,²⁷ bricolage,²⁷ disruptive,²⁸ resource-constrained innovation,²⁹ good-enough,³⁰ grass root innovation,^{18 31} cost innovation,^{20 32} that are frequently used interchangeably due to its similar premise despite its different backgrounds.^{8 31 33 34} Several core characteristics typify the approach to defining FI, including, ‘bottom-of-the-pyramid (BOP) innovation’, ‘good-enough innovation’, ‘doing more with less’, ‘resource scarcity’ and ‘sustainable innovation.’

BOP innovation

Innovative solutions to support more than four billion people who live on less than \$2 a day³⁵

According to Pisoni *et al*,³⁶ the term ‘FI’ was conceived in emerging markets to meet the needs of low-income consumers by producing innovations that maintained quality and added value but that were produced at low expenditure.^{11 25 37} However, this can be analogous to disruptive innovation³⁸ and the principle of ‘disrupting the pyramid’ in emerging markets while also focusing on those with a low-income or cost-conscious consumers in developed markets. It is also an extension of jugaad innovation,⁸ as a business model of innovation to create low-cost solutions to everyday problems. Gupta³⁹ argued that ‘*frugal innovation is a new management philosophy, which integrates specific needs of the bottom of the pyramid markets as a starting point and works backward to develop appropriate solutions which may be significantly different from existing solutions designed to address needs of up market segments*’. Brem and Wolfram¹⁸ shared the same understanding defining FI as having, ‘*...low to medium sophistication, medium sustainability, and medium emerging market orientation*’.⁴⁰ This definition again coincides with Christensen’s⁴¹ work on disruptive innovation but also Pisoni *et al*³⁶ and Prahalad’s³⁷ work on introducing creative low-cost innovations to improve the social lifestyle of those at the BOP in developing markets. Gupta³⁹ refers to

a new philosophy that involves addressing the needs of those with low purchasing power as the starting point to develop solutions that may be different to mainstream alternatives designed to address the needs of typical market segments.⁴² Gupta³⁹ further added that FI was a response to contextual concerns created with resource constraints to focus on neglected demographic consumers. It is important to note that those at the BOP are not just confined to low-income countries (LICs) but also to markets in higher-income countries (HICs), as people who earn a lower-income than the national average exists in every country, ‘*frugal innovations can target customers in any segment of the economic pyramid who are price-sensitive by choice or looking for ‘simpler’ products that best meet their real needs*’.⁴²

Good-enough innovation

Imperfect adapted innovations which involve simple and essential functions that are good-enough to meet the needs of underserved consumers and offered at low-cost^{43 44}

Angot and Plé⁴⁵ described FI as ‘good-enough’ solutions that rely on limited and cheaper resources to face resource scarcity’ which overlaps with many other definitions, such as ‘FI is ‘good-enough,’ affordable products that suffice the needs of resource-constrained consumers’¹⁶ ‘FI refers to products and services that are developed under resource constraints’⁴⁶ and ‘FI stems from resource scarcity: using limited resources to meet the needs of LICs’.⁴⁷ Zeschky *et al*⁴⁸ defined FI as ‘responding to severe resource constraints with products having extreme cost advantages compared with existing solutions’ and ‘good-enough, affordable products that meet the needs of resource-constrained consumers’ with both definitions focusing on the aspects of cost, basic functionality targeting resource-constrained consumers.

Doing more with less

Creating significantly more value while minimising the use of resources⁴⁹

Radjou and Prabhu⁴⁹ defined FI as ‘doing with more less’ and Ratten³ defined FI as ‘the affordable use of products and services that have been innovated under conditions of resource scarcity’, both referring to FI as a process of innovating in an easy to use and cost-efficient way. Although, this definition lacks any contingent aspects, it sets its focal point on the inclusion of a psychological strategy or changing behaviours by seeing resource constraints not as a disadvantage but more as an opportunity.⁴⁹ This mindset denotes a creative hemisphere where an innovator strives to deliver high quality at lower costs in comparison to more mainstream solutions. The authors also described FI as an opportunity to innovate cost effectively and sustainably under resource scarcity. The narrative of this definition aligns to that provided by The

Table 1 Definitions of frugal innovation

Definition(s)	Reference(s)
'Frugal innovation is a new management philosophy, which integrates specific needs of the bottom of the pyramid markets as a starting point and works backward to develop appropriate solutions which may be significantly different from existing solutions designed to address needs of up market segments'.	39
'...low to medium sophistication, medium sustainability, and medium emerging market orientation'.	18
'Frugal innovations can target customers in any segment of the economic pyramid who are price-sensitive by choice or looking for 'simpler' products that best meet their real needs'.	42
'The affordable use of products and services that have been innovated under conditions of resource scarcity'.	3
'Good enough' solutions that rely on limited and cheaper resources to face the resources' scarcity'.	45
'Frugal innovation is 'good-enough,' affordable products that suffice the needs of resource-constrained consumers'.	16
'Frugal innovation refers to products and services that are developed under resource constraints'.	46
'Frugal innovations are products and services that focus on crucial needs, spare resource use or eliminate non-essential features in the design process'.	52
'Frugal innovation stems from resource scarcity: utilizing limited resources to meet the needs of low-income customers'.	47
'Responding to severe resource constraints with products having extreme cost advantages compared to existing solutions'.	48
'Good-enough, affordable products that meet the needs of resource-constrained consumers'.	
'Frugal innovations are not re-engineered solutions but products or services developed for very specific applications in resource constrained environments'	20
<ul style="list-style-type: none"> ▶ Technical novelty ▶ Market novelty ▶ Refers to market, rather than product or service. 	
'Frugal innovation refers to products, services or combination of them that are affordable, sustainable, easy-to-use, and have been innovated under the resource scarcity. In general, frugal innovations are developed in and for low-income market contexts and are seen to differ from innovations in developed markets'.	31
'...characterized by affordability, robustness, user friendliness, scalability and having an attractive value proposition'.	63
'Doing with more less'	49
Principles of FI: '(1) engage and iterate, (2) flex your assets, (3) create sustainable solutions, (4) shape customer behaviour, (5) co-create value with prosumers and (6) make innovative friends'.	
'Frugal innovation is not just about redesigning products; it involves rethinking entire production processes and business models'.	1
'...Three attributes: substantial cost reduction, concentration on core functionalities, and optimized performance level'.	19
'Meeting the desired objective with a good- enough, economical means'.	17
'Frugal innovation is a design innovation process in which the needs and context of citizens in the developing world are put 'first in order to develop appropriate, adaptable, affordable, and accessible services and products for emerging markets'.	13
'Scarcity-induced-, minimalist- or reverse innovation'	64
'By economizing the usage of resource-use and aiming for simple products and services, albeit sometimes using cutting edge technology, frugal-innovations have a lot to offer for sustainable-development'.	
'Frugal innovations are not only lower in cost, but outperform the alternative, and can be made available at large scale'.	74
'Frugal innovation is a means and ends to do more with less for more people'.	7
'...a means or an ends, to do more with less, for the many'.	6
'Frugal innovation can be defined as a product, service or a solution that emerges despite financial, human, technological and other resource constraints, and where the final outcome is less pricey than competitive offerings (if available) and which meets the needs of those customers who otherwise remain un-served'.	24

Economist¹ as it denotes FI as a strategy to rethink the architecture of the production process and use materials sparingly with a conscious effort to limit negative impacts towards the environment (sustainability) 'FI is not just about redesigning products; it involves rethinking entire production processes and business models'.¹

Resource scarcity

FI occurs when there is a lack of sufficient or adequate equipment, qualified personnel, finance, institutional support or infrastructure during the development of innovative solutions.^{50 51}

Though FI is typically cited as an innovation developed in LMICs, it applies to both emerging and developed economies as they seek to target those at the BOP.³¹ Furthermore, the idea of resource scarcity is not necessarily limited to consumers at the BOP, as depicted in the definition by Gupta.³⁹ FI needs to be further explored outside the domain of affordability

due to its ability to adapt to any contextual concerns, for example, in a global crisis such as the COVID-19 pandemic, 'FIs are products and services that focus on crucial needs, spare resource use or eliminate non-essential features in the design process'.⁵² The urgency provoked an imminent need to be efficient, innovative and scalable, which initiated an increase in the development and adoption of FIs as the developed world lacked time and resources to follow the traditional process of trials and testing.^{53–55} The quick responses to COVID-19 from LICs such as India and Africa are progressing far better in comparison to HICs such as USA and in Europe.⁵⁶ Subsequently, these innovations provoke a competitive market, promoting an increase in sustainability despite significant constraints.⁵⁷

Sustainable innovation

The development of innovative solutions that contributes towards sustainable development and provides economic, ecological and social benefits.^{58 59}

A significant amount of the literature on FI connects to issues of sustainability, although the explorations of such connections may differ.⁶⁰ Many scholars argue that FI can contribute towards a more sustainable world¹³ and sustainable development,⁶¹ although other have contested that FI does not create a sustainable impact,²³ does not necessarily involve sustainability¹⁹ and are not initially eco-friendly.⁴⁷ Bhatti *et al*⁶ and Prahalad and Mashelkar¹⁵ suggested that FI involved redefining business models, reconfiguring value chains, redesigning products to target those with low purchasing power, creating a new market, using a scalable and sustainable approach. Weyrauch and Herstatt¹⁹ suggested that sustainability was not necessary for FI and defined it as consisting of ‘...three attributes: substantial cost reduction, concentration on core functionalities and optimised performance level’.

Overall, FI can be referred to a polysemy term, the existence of numerous meanings for a single term, and these are summarised in [table 1](#).

IDENTIFYING FI

The ever-increasing ways to conceptualise FI poses a significant challenge in how to actually identify one.¹⁹⁶² Some of the key characteristics typically used to describe FI and distinguish innovation types are functional and market aspects such as technical novelty, market novelty, functionality and resource scarcity¹⁹ (see [table 2](#)). According to Weyrauch and Herstatt,¹⁹ universal, multidisciplinary criteria are needed to define FI, irrespective of the context of study, due to its wide international application even in developed markets.⁶²

Bhatti *et al*⁵³ conducted a mixed-method exploratory descriptive study to search for and evaluate less well-known FIs from LMICs that possess similar potential as the oft-repeated examples such as Narayana’s US\$1500 cardiac surgery, general electric’s US\$800 portable ECG machine, Aravind’s US\$30 cataract surgery, non-electric Mitticool fridge and the world’s most affordable car by Tata Motors.⁵³ Many of these potential FIs were published by ‘innovation curator’ organisations, which identify and collate innovations providing accessible information to all who are seeking new policies, products or practice.⁵³ However, often-times there is no explicit statement of the criteria used, if at all, to identify such innovations as frugal.

Some scholars have proposed a criteria to identify FIs such as Kumar and Puranam’s¹⁴ six principles: (1) robustness, (2) portability, (3) defeaturing, (4) leap-frog technology, (5) mega-scale production and (6) service ecosystem. The FI Hub at Santa Clara University defined 10 core competencies of FI typically used to provide economically efficient, appropriate, adaptable, affordable and accessible products and services to solve needs when facing severe resource scarcity with particular attention to the emerging markets and are used to assess potential adoption.¹³ The 10

competences include: (1) ruggedisation (use of robust materials to withstand harsh physical environments), (2) lightweight (ease of transportation, portability), (3) mobile enabled solutions (unlimited connectivity sources), (4) human centric design (user-friendly for all), (5) simplification (essential and basic features and functionalities only), (6) new distribution models (‘unconventional channels and access’), (7) adaptation (leveraging existing alternatives), (8) use of local resources (designed and manufactured locally), (9) green technologies (‘powered by renewable sources’) and (10) affordability (‘based on high volume at low expenditure, attainable to those with low purchasing power’).⁶¹³ Although these competencies can serve as a rich basis for conceptualising FI, it is still unclear whether an FI must adhere to all competencies or a minimum number to be considered as an FI.

Based on literature review and interviews with managers and researchers, Weyrauch and Herstatt¹⁹ proposed criteria for a universal definition that would distinguish FI from other types of innovation. They found that much of the discourse about FI mostly occurs within three main categories: (1) substantial cost reduction, (2) concentration on core functionalities and (3) optimised performance level and they proposed that an innovation must meet all three criteria simultaneously to be considered as an FI.¹⁹ So, while each criteria on its own could also be used to describe another type of innovation, for example, cost innovation aims to produce products and services that are significantly low cost, only FI would be characterised by all three criteria at the same time.¹⁹ These principles in actual products and services are also significantly dependent on the user environment and context, that is, the core functionalities—though the criteria applies to all markets, this criteria will differ depending on the context.¹⁹

First criterion: ‘substantial cost reduction’

The premise of the first criteria of the framework, ‘substantial cost reduction’, is having products and services that are significantly lower in cost for consumers compared with more conventional mainstream products and services.¹⁹ The amount or degree of the ‘significant low cost’ is not specified but they propose that the cost reduction must be a minimum of one third of the comparable product or service, or if no alternative exists, the estimated costs, for example, importation of current solutions.

Second criterion: ‘core functionalities’

The second criterion of the framework, ‘core functionalities’ relates directly to the user requirements of the FI, that is, simplicity, ease of use, essential functions and high consumer benefits.¹⁹ According to Wooldrige²⁷ ‘numerous unnecessary bells and whistles to their products...makes the products more attractive to wealthier consumers, but the bells and whistles don’t

Table 2 Key characteristics extracted from the definitions of FI*

Key characteristic	Associated key words	Reference(s)
Affordability	<ul style="list-style-type: none"> ▶ Unnecessary costs ▶ Low cost ▶ Cost-conscious ▶ Cost-effective ▶ Minimum-cost ▶ Non-essential costs ▶ Significantly lower costs ▶ Low budget ▶ Low purchasing power ▶ Low income ▶ Low priced ▶ Economic means 	42
Adaptability	<ul style="list-style-type: none"> ▶ Addressing specific needs ▶ Flexible ▶ Conforming to needs ▶ Suffice the needs ▶ Focus on crucial needs ▶ Developed for very specific applications ▶ Meeting the needs ▶ Innovated under ▶ Doing more for less ▶ Means or an ends ▶ Needs and context of citizens in the developing world are put first 	39
Accessibility	<ul style="list-style-type: none"> ▶ Availability ▶ Convenience ▶ Ease of access ▶ In any segment of the economic pyramid ▶ Both emerging and developed markets ▶ For the many ▶ For more people 	6 7 13 16 24 31 42 45–48
Sustainability	<ul style="list-style-type: none"> ▶ Eco-friendly ▶ Ecosystem ▶ Low environmental impact ▶ Repurposing ▶ Low environmental intervention ▶ Ecological ▶ Renewable ▶ Spare resource use ▶ Sustainable development 	18 31 49 52 64
Scalability	<ul style="list-style-type: none"> ▶ Volume ▶ Profitable ▶ Expanding ▶ Scaling ▶ Changing markets ▶ Market orientation ▶ Reverse innovation ▶ Large scale 	1 18 20 39
Simplicity	<ul style="list-style-type: none"> ▶ Easy to use ▶ User-friendly ▶ User-friendliness ▶ No previous training required ▶ Low competency ▶ Strip back ▶ Essential ▶ Basic ▶ Simple ▶ Simpler ▶ Sophistication ▶ Non-essential ▶ Minimising the use of material ▶ Reduces material waste 	18 31 42 52 63 64

Continued

Review

Table 2 Continued

Key characteristic	Associated key words	Reference(s)
Emerging market	<ul style="list-style-type: none"> ▶ Bottom of the pyramid ▶ Low-income market ▶ Developing countries ▶ Developing world ▶ Low-income to middle-income countries ▶ Low purchasing power ▶ Resource constrained ▶ Resource scarcity ▶ Unserved customers ▶ Underserved consumers 	13 18 20 24 31 39 42 47
Developed market	<ul style="list-style-type: none"> ▶ Top of the pyramid ▶ High-income market ▶ Developed countries ▶ Developed world ▶ High-income countries ▶ Medium to high purchasing power 	39 42
Functionality	<ul style="list-style-type: none"> ▶ Essential ▶ Appropriate ▶ Minimalistic ▶ Minimalism ▶ De-featuring ▶ Unnecessary frills stripped out 	19 64
Performance	<ul style="list-style-type: none"> ▶ Optimisation ▶ Robust ▶ Outperform ▶ Enhanced ▶ Advanced ▶ High quality 	19 74
Process	<ul style="list-style-type: none"> ▶ Approach ▶ Procedure ▶ Moving counterparts 	6 7 13
Outcome	<ul style="list-style-type: none"> ▶ Result ▶ Conclusion ▶ Consequence ▶ Reaction 	24 31
Mindset	<ul style="list-style-type: none"> ▶ Psychological ▶ Cognitive ▶ Behaviour ▶ Lifestyle ▶ Mentality ▶ Attitude ▶ Ethos ▶ Decision making ▶ Thought process 	17 49
Resource scarcity/constrained	<ul style="list-style-type: none"> ▶ Limited resources ▶ Sparing resources ▶ Budget constraints ▶ Insufficiency ▶ Resource shortages ▶ Limited or no access ▶ Shortages 	3 16 20 24 31 45–48 64
Good-enough	<ul style="list-style-type: none"> ▶ Sufficient ▶ Suffice ▶ Functional ▶ Acceptable ▶ Appropriate ▶ Passable ▶ Decent ▶ Satisfactory ▶ Contention 	13 16 17 45 48

Continued

Table 2 Continued

Key characteristic	Associated key words	Reference(s)
High value	<ul style="list-style-type: none"> ▶ Potential ▶ Profitable ▶ Scalable ▶ Attractive ▶ Novelty 	20 49 63

*Adapted from Weyrauch and Herstatt.¹⁹
FI, frugal innovation.

really deliver any essential value'. This criterion is not limited to cost, but extends to saving resources, lowering the impact on the environment and addressing specific consumer behaviours.^{13 19 27 47 63–65}

Third criterion: 'optimised performance level'

The third criterion, optimised performance level, is perhaps the most important of the three criteria as it is believed to encapsulate the true meaning of FI.¹⁹ FIs should 'meet the required performance level that fulfils its purpose and the local conditions'.¹⁹ The term 'performance' encompasses a wide array of functionalities and engineering characteristics, for example, speed, durability and power and will vary depending on the type of innovation, that is, the components of a frugal car will differ to those of a frugal ultrasound device.¹⁹ Tiwari and Herstatt⁶³ stated that FIs are 'fulfilling or even exceeding certain predefined criteria of acceptable quality standards'.⁴

TOWARDS AN INTEGRATED VIEW

More recently, scholars have developed an integrated view of FI that combine technological and market aspects. For example, Hossain³¹ defined FI as 'a product, service or a solution that emerges despite financial, human, technological and other resource constraints, and where the final outcome is less pricey than competitive offerings (if available) and which meets the needs of those customers who otherwise remain unserved'.^{24 31} This definition integrates issues of affordability, basic functionality, simplification and serving those with income constraints. They refer to FI as a process of creating simple low-cost products to create value for consumers with low purchasing power,²⁴ which also seemed to overlap with aspects of Tiwari and Herstatt's⁶³ definition of FI, '...characterised by affordability, robustness, user friendliness, scalability and having an attractive value proposition'.

Soni and Krishnan¹⁷ conducted a typology review of FI and presented three types of FI: (1) mindset, (2) process and (3) outcome in the form of products or services. At the basic level, the concept can be thought of as 'way of life' or lifestyle whereas on an activity level, it was thought of as a process in which the 'outcome' reflects the actual good or service.¹⁷ They defined FI as 'meeting the desired objective with a good-enough, economical means' and referred to it

as an outcome of frugal engineering which was signified as the process.¹⁷ In contrast, Basu *et al*¹³ defined FI as 'a design innovation process in which the needs and context of citizens in the developing world are put 'first in order to develop appropriate, adaptable, affordable and accessible services and products for emerging markets' and thus referred to FI as complex process as opposed to just an outcome.

Bhatti and Ventresca⁷ critically reviewed the typology of various definitions of FI and proposed a theory-driven definition through analysing the concepts of 'frugality' and 'innovation' individually from a historical and current perspective. They argued that the concept of FI was not novel and dates back to World War Two.⁷ Bhatti *et al*⁶ interviewed social entrepreneurs and developed a framework that used a range of theories such as resource-based view, competitive advantage and creation of shared value to demonstrate the theoretical aspects of FI. The authors defined FI as '...a means or an ends, to do more with less, for the many'^{6 50}, which is anchored to three core characteristics: (1) affordability, (2) adaptability and (3) accessibility, that apply to goods, processes and business model innovations and is not limited to a certain market.⁶

Affordability ('means and ends') refers to the process and outcome of an innovation, which may include low expenditure materials, cost-effective delivery, cheaper manufacturing or disposal.⁶ Adaptability ('to do more with less') refers to the efficiency and versatility of the innovation to the contextual needs, whereby the product can be 'good-enough'.⁶ Accessibility ('for the many') refers to the entire population as a target market, including those at all levels of the pyramid, as all could benefit from the innovation and allows for future scaling.^{6 53 54} However, before scaling could be considered there are number of challenges impeding the successful adoption of FI and its subsequent translation to other sectors such as policy-making, funding regulations and institutional and contextual barriers (social and cognitive).

NEXT STEPS FOR POLICY, PRACTICE AND RESEARCH

Despite this array of perspectives and definitions, scholars do agree that the characteristics of FIs are

different to those of mainstream innovations, for example (1) the geographical context is different,⁶⁴ (2) the diffusion pattern is different,⁶⁶ (3) business models are different⁴⁸ and (4) distribution channels are different.²⁴ Although there is no universal definition, many share the basic principles of (1) cost or affordability, (2) functionality, (3) accessibility and (4) sustainability.^{6 13 19 59} FI essentially encompasses the idea that more value can be achieved using less expenditure while using the resources available.

According to Ratten,³ a clear definition of anything should adhere to three characteristics: (1) 'measurable design elements ('evaluation of term or concept'), (2) validity ('application to setting' or context) and (3) theoretical foundation' ('supported by research').³ Bhatti *et al*⁶ provide a definition supported by a theoretical underpinning and consolidates the predominant principles involved in previous definitions.

There are many semantic benefits to a universal definition of FI such as a unified understanding and approach—what is it, how will it work, how can it be applied and what is needed. Although there is growing interest and publications exploring FI, its application and effectiveness, there is still a lack of a comprehensive theoretical understanding of FI.^{6 7 50} To fully grasp what FI is, a standardised approach needs to be developed. It could be argued that FI has a political component because it detracts attention from deeper inequities and socioeconomic classification of countries, distribution of resources and geo-political power. FI diverts attention away from questioning why some countries lack the resources to innovate in the same way as other HICs. On the other hand, it could be argued that the exploration and implementation of FI across contexts, though global learning, can overcome some of these geo-political power differentials and support an awakening that higher-income contexts have much to learn from lower-income ones. Ambiguity surrounding the conceptualisation of FI could be attributed to the overtheorisation of the concept resulting in excessive definitions and perspectives.^{67–70} It may be that a pragmatic way to identify an FI is not to examine it against ill-defined concepts but to compare it to its next closest alternative. If, compared with the incumbent, the innovation is more affordable, more accessible and more adaptable, then it might be an FI.^{71 72}

The existence of numerous definitions of FI did not halt its development and implementation, but it did in fact increase interest in, knowledge of and market for FI. However, consolidation of the various definitions of FI has the capacity to add a significant value to practice and research such as building a reporting group explicitly focusing on FIs, assessing the impact of such innovations, create a body of knowledge about FI and agreement around how to standardise reporting of such innovations.⁷³

CONCLUSION

Although there is growing interest and efforts to understand, design and develop FIs with the aim of mitigating problems efficiently and effectively, there still remains the challenge of conceptualising and characterising FI due to its significant overlap with other innovation types. But perhaps this is due to the diversity in definition for other concepts which feature in the definition of FI such as sustainability, low income and good-enough. Defining FI as a concept should not deter from focusing on its core aim. Identifying an FI may be best achieved by comparing it to an incumbent alternative, rather than against an ill-defined concept. There is merit in developing a common understanding of FI to support strategies for its successful acceptance and diffusion globally.

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