Leapfrog and reverse innovation for survival of innovative start-ups: A conceptual framework and a logistics case

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Abstract

Rapid and sustained innovation in developed markets triggers the generation of innovative start-ups, some with disruptive innovations. However, when their offering faces a saturated market with satisfactory and widely available established traditional solutions, many innovative start-ups from these markets may fail. The literature on some start-ups that successfully brought their innovation to emerging markets shows how using leapfrogging traditional solutions to innovative solutions can offer survival and growth opportunities to these start-ups. However, a wide exploitation of leapfrogging processes in emerging markets for survival or business growth of innovative start-ups from developed markets is not yet theorized. To contribute to closing this gap, we propose a conceptual framework to assess the readiness of an emerging market to leapfrog to innovative solutions.

The design of the conceptual framework uses a scenario-planning like approach with two key factors, namely Context Readiness and Value Network Integration. To test and refine the proposed framework and show its relevance for coming to an informed expansion decision making, we used PAR (Participatory Action Research). For the illustration of the application of the proposed conceptual framework, the case of telehealth in Morocco is used.

With this work, we contribute to both knowledge and business development for improving survivability of innovative start-ups or SMEs by proposing a conceptual framework:

- to be used to sense and qualitatively assess the plausibility of leapfrogging opportunities in a given sector in emerging market.
- that can effectively be used by innovative start-ups or SMEs in their process of identifying opportunities for closing the gap between their innovative solution development and its adoption and implementation.

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Key words: Start-ups, survival, innovation, failure, international entrepreneurship, adoption, implementation, , emerging market, developed market, leapfrog, reverse innovation, delivery, logistics, conceptual framework,

Background

Cbinsight (cbinsights, 2022) found that 70% of start-ups tech companies fail, usually around twenty months after first raising financing. 35% of start-ups failure cases are related to failure to serve a market need, cited as the no. 2 reason for failure (cbinsights, 2021). In his research on start-up failure, Eisenmann (Eisenmann, 2021) stated that validating concepts with real customers in real-world is one of the key elements for start-ups to avoid a false start, one of the two especially common recurring patterns that doomed ventures. Rapid and sustained innovation in developed markets triggers the generation of innovative start-ups, some with disruptive innovations. However, when their offering faces a saturated market with satisfactory and widely available established traditional solutions, many innovative start-ups from these markets may find themselves in an arrested development status at home or even fail. Closing the gap between the development of innovative solutions and their adoption and implementation may not be straightforward.

The aim of the work presented here is to contribute to the development of knowledge and processes for the increase of the rate of success of innovative start-ups struggling to launch break-out solution in their saturated home market. One of these processes is exploiting relevant leapfrogging of traditional solutions in emerging markets for test, adoption and even implementation of innovative solutions. The literature on some start-ups that successfully brought their innovation to emerging markets shows how leapfrogging traditional solutions to innovative solutions can offer survival and growth opportunities to innovative start-ups. The absence of literature on "how" to confidently sense and assess leapfrogging opportunities in a given emerging market served as motivation for this study. The focus of this work is to answer the question "How to assess that a given sector in a given emerging market has relevant leapfrogging opportunities and offer validation, adoption and implementation opportunities to a given innovative solution?". The objective is to propose a conceptual framework that could be used by start-ups to evaluate the plausibility of emergence of relevant leapfrogging opportunities in a given sector in a given emerging market or in a region in that emerging market. The conceptual framework is a tool to assess the readiness of an emerging market to leapfrog to innovative solutions in a given sector. This is to speed up the validation of the value proposition and adoption and implementation.

Keeping in mind the context dependent application of the proposed framework and the need to show its relevance for decision making the focus is on start-ups that:

a) Are from a developed market.
b) Have innovative "access to" delivery systems preferably combining devices, and digital platforms
c) Face barriers for testing, validating, adopting and implementing their solution in their home market.
d) Have specialised, customised and niche approach to the market.
e) Are willing to be among first movers in an emerging market.

To demonstrate the relevance of the framework and later its rigor, we use Participatory Action Research. For the illustration of the application of the proposed conceptual framework, the case of telehealth is used.

Relevance of emerging market for innovative start-ups survival

Emerging markets are countries that are in transition phase to become a developed countries both economically and structurally as their financial and regularly systems mature. Approximately 85% of the world population lives in an emerging market. Emerging markets account for 90% of the global population aged under 30. Because of their growing economy, they have growing consuming populations. However, the difficult access of a good share of these populations to some key services such as healthcare, education, energy and drinking water may slow their growth. The non-affordability of investments in infrastructure for governments, the centralised character of traditional delivery solutions, well established in developed markets, the shortage of required qualified staffing to operate them could trigger leapfrogging to more easily replicable emerging technologies in delivery systems. A well-documented example is the roll-out of mobile phones. This provided opportunities for many emerging countries to develop by skipping fixed-line telephone systems and associated infrastructure subjected to the decision making of governments as the main providers (Amankwah-Amoah, 2015; Coster, 2011).

How leapfrogging might help?

Leapfrogging occurs when a nation bypasses traditional stages of development to either jump directly to the latest technologies (stage-skipping) or explore an alternative path of technological development involving emerging technologies with new benefits and new opportunities (path-creating) (Yayboke, 2020). Because of their convenience and potential time and cost effectiveness, new solutions for delivery of services or products to homes may positively affect emerging markets governments decisions for leapfrogging traditional solutions. The subsequent process to leapfrogging for start-ups could be reverse innovation. Reverse innovation is the process of

innovating in an emerging market and then bringing back those tested, validated, adopted innovations and acquired knowledge to a developed market (Govindarajan & Trimble, 2012; Malodia et al., 2020). Several multinational companies (MNCs) such as GE and its low cost Electrocardiogram (ECG) device, Apple with its iPod Nano watch and LG with its Low-cost Air Conditioners have used this process (Khan, 2021).

Because of limited transportation infrastructure and limited number of distributors with logistics capabilities, emerging markets tend to have inadequate logistics. This results in long travel time and high travel expenses for customers that face difficulties with traditional kinds of transportations. The disadvantage of an imperfect infrastructure or the shortage of highly qualified staffing required for traditional delivery solutions in emerging market might turn into an advantage for an innovative start up to provide delivery services that fill the needs. Start-ups offering affordable products or services, combined with innovative and easy to replicate delivery services may find growth opportunities in leapfrogging traditional delivery systems in emerging markets. The use of Unmanned Aerial Vehicles (UAV's) or drones in delivery services in healthcare systems is one example for such start-ups. Despite their benefits, this type of service went seldom beyond pilots in developed countries (Fenwick et al., 2017). The focus of the regulator on the risks posed by drones instead of their potential benefits, the crowded airspace in developed markets were slowing factors that limited tests and validation of the drones value proposition. The use of drones in logistics in emerging markets may be part of the solution to some key transportation and logistics problems and then delivery issues. Their use in emergency scenarios where medical and relief supplies must be delivered quickly to remote area is a good example. For these reasons combined, the start-up Zipline created in 2016 left the US to Africa already in 2016 to explore drones as a new delivery system for medication and blood for diagnosis and treatment (Levy, 2022). Following a deal with the Rwandan government, Zipline, by couriering blood and drugs between a centralised laboratory and remote villages in Rwanda in 2016, allowed the medicine to reach remote areas underserved by traditional logistics. Zipline has expanded its operations to Ghana in 2019. Another American company, Vayu, is also flying blood and laboratory materials from rural villages to a research station for testing in Madagascar (Knoblauch et al., 2019). The same was with Avy, a Dutch drones start-up created in Amsterdam in 2016 and raised in Africa (Avy, 2022). Avy had activities in Botswana for example.

Why Rwanda, Ghana, Botswana, Madagascar? Was that the result of trial and error or a well thought out choice?

The question that a start-up manager or team could ask when sensing relevant leapfrogging opportunities in emerging market is:

How ***to assess*** that a given sector in a given emerging market has relevant leapfrogging opportunities and offer validation, adoption and implementation opportunities to a given innovative solution?

Our Approach

Beyond operationalisations, the consulted literature does not offer any conceptual or empirical findings on how leapfrogging in emerging markets could offer survival and growth opportunities to innovative start-ups from developed markets. Figuring out approaches that help these start-ups to cost effectively and confidently assess and sense leapfrogging opportunities in emerging markets with a strong demand but inadequate "access to services or products" is very important for their survival and further development. The approach proposed is centred on the development of a conceptual framework asses and sense leapfrogging opportunities.

Proposed Conceptual Framework

Identifying needs for improving "access to" products and services in an emerging market is not the same as transforming these needs into a viable business opportunity. Adoption and implementation of innovative solutions that fill in these needs remain two driving forces of the success of their introduction even in a leapfrogging market. Innovation adoption is defined here as the process of potential users seeing value with it and deciding to work and establish a habit with it, deliver it as intended and continue to use it over a longer period of time (Durlak & DuPre, 2008; Rogers, 2003; Zanaboni & Wootton, 2012). Implementation is defined here as the activities that are undertaken to realize the adoption, dissemination and continuous use of a product or service in its intended context (van Gemert-Pijnen et al., 2018).

When looking for adoption and implementation opportunities in a leapfrogging context, because of the time and resources constraints of start-ups, start-ups managers cannot afford to take into account the multitude of factors influencing this process. Using a scenario-planning like approach (Lindgren & Bandhold, 2009; Ringlad, 1998; van der Heijden, 1996; Wade, 2012), we identify and zoom in on the two most critical factors with high impact on the

adoption and implementation process: Context Readiness and Value Network Integration levels, both of which concepts are defined below. Considering the population to be served as well identified, our hypothesis is: Context Readiness and Value Network Integration are the two key necessary and sufficient factors to assess the readiness of a given emerging market to leapfrog, adopt and implement a new service or product in a given sector.

1) Context Readiness

We define Context readiness by two factors: Policy readiness and Payment readiness.

Policy readiness

Policy is defined here as decisions that are made at national or local level about what services to the public will be funded and about how (and by whom) they will be delivered(Greenhalgh et al., 2017). Policy making for the infrastructure and skills development, for payments modes and subvention for access to products or services are key for the adoption and implementation of innovative solutions. Policy making is part of the contextual environment as defined by Van der Heijden (van der Heijden, 1996), i.e. that part of the environment which has important repercussion for the organisation, here a start-up, but in which the organisation has limited influence. The lack of policies, regulations and their enforcement stimulate informal business generation in emerging markets, a context that start-ups from developed markets do not or seldom know or can manage.

Payment readiness:

Payers for services or products are often the customers themselves or organizations that set service rates, process claims, and pay providers claims. Payers could be private such as private healthcare insurance plans and employers or part of the public sector such as public organisation, subsidies or healthcare insurance scheme or non-governmental organisations. Availability of suitable and easy payment arrangements for providers and consumers are key for transactions and then for adoption and implementation of innovations. Many emerging markets have substantial numbers of unbanked people (Demirgüç-Kunt et al., 2022). Payments are then mainly made in person and in cash. This is also the rule for informal businesses. This limits payment ability for remotely accessible services to a small segment of population or to public or formal private organisations. It will have a high impact on the business models to be adopted when considering entering an emerging market.

2) Value Network and integration

Building on the term value network introduced by Christensen and Rosenbloom in 1995 (Christensen & Rosenbloom, 1995), we define it as: "the context within which a firm competes, solves customers' problems and creates value for them and for itself ". The value network members here are those involved in value creation and value delivery, namely **P**roviders of innovative solutions and **P**roviders of services or products to customers. They are both part of the transactional environment (van der Heijden, 1996), i.e. that part of the (contextual) environment in which they are significant players, influencing outcomes as much as being influenced by them. The definition of integration used here is that given by Stremersch & van Dyck (Stremersch & van Dyck, 2009) : "The extent to which a network of organizations or units within one organization provides or arranges to provide a coordinated continuum of services". Interactions between members of the value network have the possibility to provide a viable market and to benefit the members and their target customers population. Figure 1 below gives an example of patient centred interactions between the value network members and the context readiness factors in telehealth.

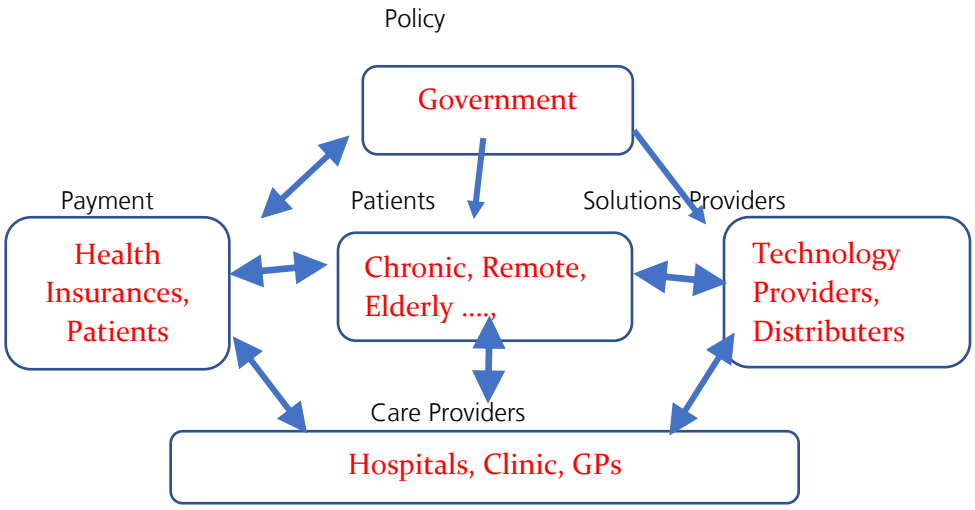

Figure 1: Value Network and Context Interactions (Patient Centred)

(Inspired by Stremersch & van Dyck (Stremersch & van Dyck, 2009))

As an example of the influence of changes in policies readiness and of the value network integration levels on the adoption and implementation of disruptive delivery systems we mention the change brought by the arrival of COVID-19 pandemic. Worldwide, COVID-19 pandemic increased policies readiness and value network members integration levels to keep delivery processes working.. New models such as pay on delivery were adopted in large cities in emerging markets as Cash on Delivery payment was made possible there. In several emerging markets, Covid-19 triggered leapfrog actions in healthcare, education and retail delivery. Stronger increase in online

shopping activities in post-COVID is foreseen (Netcomm Suisse Observatory & UNCTAD, 2020). Covid-19 also triggered reverse innovations. As the drones require minimal human interaction, the first delivery for Zipline Inc. in the U.S. was in North Carolina in May 2020 when the COVID-19 pandemic struck. It was done in collaboration with Novant Health which runs fifteen hospitals and nearly 700 clinics for delivering medical supplies and personal protective equipment (de León, 2020).

Conceptual framework design

The conceptual framework is designed as a classic 2x2 matrix, scenario cross. It uses the interplay of the two key factors defined above, namely Context Readiness and the Value Network Integration levels, both of which can vary between high and low (Figure 2). The four quadrants of this framework define the four scenarios area to be used to evaluate the plausibility (Schmidt-Scheele, 2020) of leapfrogging potential of a given emerging market or a region in an emerging market for a given sector. Each quadrant is defined by whether Context Readiness level will be either "high" or "low", and whether, at the same time, Value Network Integration level is either" high" or "low" (Wade, 2012). Starting from top-right and moving anti-clockwise on the matrix in Figure 2, one has the following four scenarios for a given country:

1) The Context Readiness level is high, and the Value Network Integration level is high too. This situation often occurs in a developed market and seldom in emerging markets. New technologies or solutions may be developed there and co-exist with the old technologies or solutions before supplanting them.
2) The Context Readiness is low while the Value Network Integration is high. This situation occurs in an emerging market or a region in an emerging market. The weakness of the Context Readiness could be related to the weakness of institutions. Leapfrogging may take place there but may not go beyond piloting projects.
3) The Context Readiness level is low while the Value Network Integration level is low too. This situation often occurs in a developing market. Leapfrogging may be very limited or even not possible.
4) The Context Readiness level is high while the Value Network Integration level is low. This situation often occurs in an emerging market or a region in an emerging market. The weakness of the integration of the value network could be related to weaknesses of infrastructure, of the efficiency of systems or the uneven

distribution of providers of services and providers of solutions. Nevertheless, leapfrogging may take place there as policy may be supportive and Value Network integration can be local.

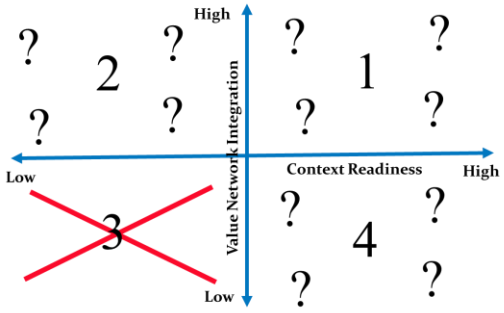

Figure 2. Conceptual framework: a 2x2 matrix, scenario cross for assessing leapfrogging traditional solutions opportunities in an emerging market

Our expectation is that leapfrog opportunities are to be found in quartiles 1, 2 and 4, whereas in quartile 3 leapfrogging is not possible.

To show the relevance and usability of the conceptual framework and to confirm or infirm the hypothesis above, namely that Context Readiness and Value Network integration levels are necessary and sufficient to have a reliable framework we use Participatory Action Research (PAR) approach (Baldwin, 2012), internationalisation (Cavusgil et al., 2013) and adoption and implementation (Greenhalgh, 2017) theories. PAR allows the involvement of start-ups and members of the value network, namely **P**roviders of innovative solutions and **P**roviders of services or products to customers, in codeveloping the framework and validating its relevance and usability in their emerging market context. This makes sure that involved start-ups and value network members interactively co-produce a framework that reflects their perspectives, priorities and concerns and use their personal opinion, expertise, and experience on adoption and implementations of innovations in their emerging market. In this paper we validate the relevance of the framework[2] through application in healthcare sector.

Application of the conceptual framework: telehealth example

[2] The ongoing PAR process required for the rigor part, i.e. to prove or disprove the hypothesis H1 is not included here. This means that the ability of the proposed framework to reliably "predict" the possibility of a given emerging market or a region in an emerging market to offer leapfrogging opportunities worth seizing to speed up adoption and implementation of innovative solutions is not fully included here.

According to the World Bank, due to weak healthcare systems in many countries some 400 million people lack access to essential healthcare services, mostly in Africa and South Asia. Physician per inhabitant ratio in the developing countries' is less than one thirtieth of the level in high income countries (Schanz, 2019). The non-affordability of investments in infrastructure, the centralised character, the shortage of required qualified staffing for traditional healthcare solutions slow their adoption or replication in emerging markets and could trigger leapfrogging to more easily replicable emerging healthcare delivery technologies. We consider here telehealth as it affects positively clinical practice of medicine, investments in infrastructures and equipment, the financing for services and regulations. In their paper, Almojaibel and al. report the following definition of telehealth (Almojaibel et al., 2020): Telehealth is the use of telecommunication technology and electronic devices to enable remote clinical health care and health-related education. In other words, it is offering healthcare remotely to the patient's home or neighbourhood (Greenhalgh et al., 2017). It is a game changer in healthcare delivery. How to know, with a good degree of confidence, that this is going to happen in a given emerging market and be an early mover to take advantage of it as an innovative start-up? This is what the conceptual framework is designed for.

Using the conceptual framework, the assessment of the plausibility of a leapfrogging scenario leading to the introduction of telehealth has to be done on the basis of context readiness and value network integration levels defined for telehealth. Keeping in mind that patients are central for adoption and implementation of telehealth, the elements to be evaluated for telehealth are:

A) Patients Target Segment fitness

It is important to make first sure that there is an expressed or latent need in the given emerging market for the start-up offer. It is important for patients' segment selection to consider current logistics for patients from that segment, their mobility constraints, the needed frequency of healthcare visits, their total costs in time and money for access to care their direct or indirect digital literacy. Chronic, rural, elderly patients may come first. The business relevance of the chosen segment has to be regularly evaluated.

B) Context Readiness

The availability of adequate policies affecting telehealth introduction, such as for infrastructure, skills, and regulations for prescription and payments may affect early adoption and implementation of telehealth related

solutions. To evaluate the Context readiness for telehealth we have to evaluate its two elements given above, namely, Policy making and Payment.

Policy making: Private care providers and solutions distributors may be hesitant to invest in telehealth where there is no or weak policies for telecommunication infrastructure, digital skills development, digital prescription and payment for remotely delivered care services. Whether and how policy concerns for telecommunication infrastructure, digital skills development, payment for telehealth services, privacy and confidentiality are resolved can affect both the development of telehealth programs and their benefits and costs for both providers and patients (Institute of Medicine (US) Committee on Evaluating Clinical Applications of Telemedicine, 1996). The availability of forward looking policies in the form of investment in infrastructure, institutional mechanisms to transition towards a digital future, subsidies of demonstration projects to encourage telehealth and introduction of related technologies, policies to adapt skills development and payment modes for that are a must for context readiness for telehealth. Their availability and application have to be evaluated.

Payment: Nearly two billion adults globally, one-third of the world's adult population, remain unbanked. Nearly all of them live in emerging markets (Demirgüç-Kunt et al., 2022). Emerging markets also have substantial numbers of people not covered nor by public nor by private health insurances. Many patients pay then the cost of healthcare out of pocket and in cash. In 2015, the share of out-of-pocket spending in total healthcare expenses had an average of 38% in low-income countries, 40% in lower middle-income countries and 31% in upper middle-income countries. The median share of private voluntary insurance in total healthcare expenditure is less than 2% (Schanz, 2019). In these circumstances, the payment for digital care services could be a real challenge for telehealth development in emerging markets. Policies for health coverage and for alternative payments methods to cash are determinant for context readiness for leapfrogging to telehealth and must be evaluated.

C) Evaluation of Value Network Integration for telehealth

For a chosen target segment of patients, the level of integration and the direct interaction between healthcare solution providers and care providers are key for the adoption, implementation and dissemination of innovative care solutions (Durlak & DuPre, 2008; Greenhalgh, 2017; Greenhalgh et al., 2017). Healthcare solutions providers need care providers for adoption, dissemination, implementation of innovative solutions and vice versa. They are

then both key for the success of any leapfrogging process. The level of integration of value network members for telehealth can be evaluated by how, through interaction, both new healthcare solutions providers and care providers are working together to remotely connect and care for the target patients' segment and be paid for their interventions. Who are they?

1. **Care Providers.** In emerging markets, geographic distribution of healthcare facilities often shows their concentration in their major cities. This may affect the integration and direct interaction between healthcare professionals in the country. In general, specialties have the highest physician shortage there and they are mainly concentrated in major cities leading to having hospitals and specialties clinics overcrowded and overburdened. Telehealth may play a vital role for specialties clinics and hospitals to move to triage patients who really need face to face consultation with specialists and help specialists to consult and prescribe remotely for patients who do not need face to face consultations. Resulting avoidance of higher travel costs in time and money for patients far from major cities and avoidance of long waiting times for a face-to-face appointment without affecting quality can be drivers for leapfrogging to telehealth. In this paper, we focus on specialists as care providers as they can be considered as the core of the decision-making unit for adoption and implementation of innovation**.**
2. **Healthcare Solutions Providers.** Healthcare solution providers here cover both innovative healthcare solutions producers, such as start-ups developing devices or healthcare platforms, professional users of these solutions for care needs such as clinical laboratories, and local distributers such as pharmacists or resellers of devices or equipment. Here also, in emerging markets, distributers of healthcare solutions are mainly concentrated in major cities. It is important to consider, in the value network integration evaluation their regional distribution in the considered country.

We consider here the case of four B2B Dutch start-ups (cf. Table 1) active in healthcare . All four start-ups were facing slowness in their value proposition validation process at home or faced challenges in meeting sophisticated requirements of potential local early adopters. Their target customers in general and early adopters in particular use rival's existing well established satisfactory solutions. The healthcare sector in Morocco was proposed as a possibility for closing the gap with validation, adoption and even implementation of their solutions. The four start-ups were involved in a a Participatory Action Research (PAR). This is also done to iteratively refine the design of the proposed conceptual framework and to test it.

Table 1. Four Dutch Start-ups involved in PAR process

Start-up	Value Proposition	Offer
Tomas B.V. 2016	Waistband without any adhesives for stoma patients confronted with leaks, skin problems and the associated nuisance and pain	Waistband for stoma patients
Avy 2016	Last mile delivery transport of blood products and medicines between blood banks and hospitals	Long range drones for medical transport and firefighting services
LIV 2017	Discriminate at home, atrial fibrillation (AF), a common arrhythmia, from normal cardiac rhythm.	One lead ECG recorder; Cardiology Call Centre
HICA 2020	Hand Controller and Virtual Reality gaming in rehabilitation of stroke upper limb and in Parkinson's patients	Hand Controller and Virtual Reality gaming for stroke patients

For a population of 36 million inhabitants, Morocco has a ratio of 7.1 doctors per 10,000 inhabitants, far from the standard of the World Health Organization (WHO) set at 15.3 doctors per 10,000 inhabitants (Zerrour, 2021). 63% of the Moroccan population has medical coverage (Ministère de La Santé, 2018). Chronic diseases account for 75 % of all deaths. Cardiovascular diseases, diabetes, and cancer are among the leading causes of death (57 %) (Chadli et al., 2018). In the public sector (resp. private sector), the size, composition and distribution of health workforce by region shows that medical health professionals are mainly concentrated in six out of twelve regions that Morocco has (resp. in 4 regions out of the six regions). Distributors of medical equipment and devices and major clinical laboratories are also concentrated in the same regions around major cities. The regional disparities in care providers and healthcare solutions providers makes that many patients with cardiovascular, diabetes and cancer have difficulties to continuously and timely access the required care, mainly to the specialised care. Bank account ownership rate in 2021 was 44 % (Demirgüç-Kunt et al., 2022).

For the use of the conceptual framework, criteria for context readiness and value network integration levels given in Table 2 were agreed between start-ups and involved local value network members. The conceptual framework was first used for assessing Morocco and Casablanca as the most advanced region in Morocco. Given the results from the conceptual network (cf. Figure 3), it was agreed to focus first on Casablanca region with higher value network integration and higher context readiness, mainly due to payments.

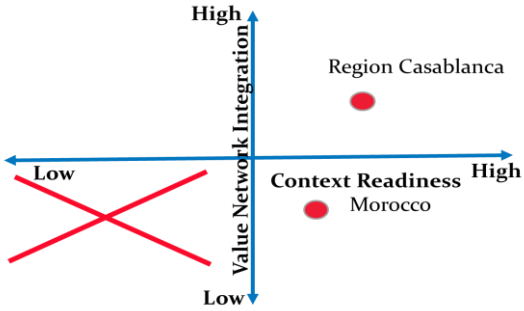

Figure 3. Use of the conceptual framework for Morocco and Casablanca region

For the test, refinement and application of the conceptual framework to the start-ups, next to the four start-ups, stakeholders from the value network in Casablanca region were involved in the PAR process. Throughout the planning, action, observation, and reflection stages of the PAR process, 5 cardiologists, 5 visceral surgeons, 3 general practitioners, 7 medical equipment and devices distributors, 56 physiotherapists (survey), 5 pharmacies, one NGO and two universities, one Dutch and one Moroccan were involved. Table 3 summarizes the results obtained using the conceptual framework for the four start-ups. It gives the most plausible scenario for each start-up and the actions worth taking as a follow-up, as agreed by involved stakeholders. To illustrate how we came to these results, we give below some details on the cases for Tomas B.V., Avy and Liv.

Tomas B.V.: The value proposition of Tomas B.V. in the Netherlands is (Tomas, 2021): "A waistband without any adhesives for stoma patients confronted with leaks, skin problems and the associated nuisance and pain". This value proposition is validated in the Netherlands but despite the demonstrated superior benefits of the waistband, its discriminator, short payback time and cost competitiveness, its introduction in the Dutch market faced fierce competition from well-established traditional pouches with adhesive supports. In Morocco, patients with stoma faced scarcity of pouches, their distribution issues and their relatively high out-of-pocket costs. The use of the framework for Tomas B.V. in Casablanca region led to the result given by Figure 4. The conclusion was that there is an opportunity for leapfrogging the use of both traditional pouches and adhesive supports. However, this requires a modified value proposition and the adaptation of the waistband to the local context. The adapted value proposition is: "A waistband without any adhesives for stoma patients confronted with high costs and difficult access to traditional pouches with adhesive supports, leaks, skin problems and the associated nuisance and pain". For this, Tomas B.V. had to review the waistband design to be able to use common bags commercially available

everywhere and much cheaper than traditional pouches. This creates a real opportunity for piloting and later reverse innovation. A pilot is designed for tests with professionals and stoma patients.

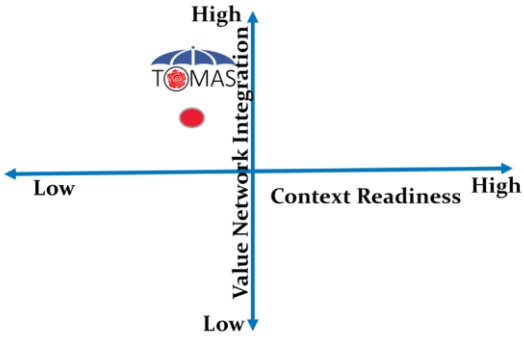

Figure 4. Use of the conceptual framework for Tomas B.V. in Casablanca region

Avy: Born in the Netherlands and raised in Africa (Avy, 2022), Avy's early value proposition in the Netherlands was: "Ensure urgent logistics, speedy deliveries in time of traffic jams and clogged roads**".** For Africa, this value proposition became "Last mile delivery transport of blood products and medicines between blood banks and hospitals". After success of pilots in Sub-Saharan Africa for delivering medical supplies and commodities, Morocco was considered for replication. Hospital facilities in small cities and medical laboratories in Casablanca region were identified as value network members in need of fast logistics systems. The use of the conceptual framework led to the positioning of Avy on the scenario cross as given by Figure 5. While the value network members were positive and willing to use the drone services, its integration for the usage of drones was low and the policy was a blocking as drones are banned in Morocco for commercial use. Skills were not readily available. All this was a showstopper.

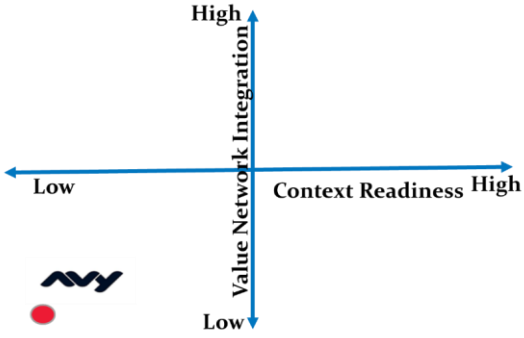

Figure 5. Use of the conceptual framework for Avy in Casablanca region

Liv: Liv developed a portable single lead electrocardiogram (ECG) device, a mobile app, and a call centre concept for atrial fibrillation management for stroke prevention. Its value proposition was:" Discriminate at home, atrial fibrillation (AF), a common arrhythmia, from normal cardiac rhythm.". Opportunities to replicate tests and validate the value proposition and the business model were very limited in the Netherlands. Morocco was considered for alternative test and validation opportunities. Cardiologist and distributors of medical equipment were identified as customers and the value network members. The use of the conceptual framework led to the positioning of Liv on the scenario cross as given by Figure 6. The value network, well integrated, and their patients were willing to test and validate both the value proposition and the business model. But the policy side was also here a showstopper: digital prescription did not exist and digital payment for care services was not allowed.

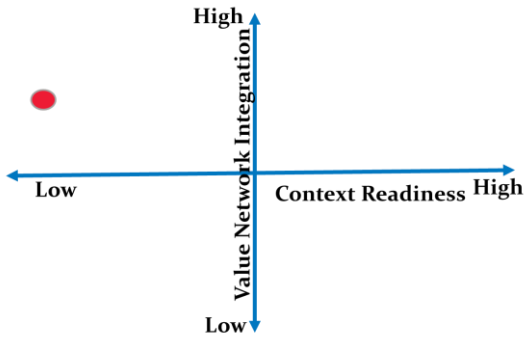

Figure 6. Use of the conceptual framework for Liv in Casablanca Region

Discussion

The aim of the work presented here is to contribute to the development of knowledge and processes for the increase of the rate of success of innovative start-ups in developed, often saturated markets. The literature found on failures of start-ups is mainly focused on understanding or explaining "why" they fail. The literature on some innovative start-ups that successfully brought their solutions to emerging markets to survive gives examples of how leapfrogging traditional solutions to innovative solutions there can offer survival and growth opportunities to innovative start-ups. These examples are not enough to stimulate the replicability of this process. At our knowledge, the process of sensing and using leapfrogging opportunities in a given emerging market for survival and growth of innovative start-ups is not theorised. The proposed conceptual framework has as an objective to

contribute to closing this gap. A successful expansion of a start-up in an emerging market may eventually lead it to bring its validated, improved, adopted and even implemented innovative solution back home.

The design of the conceptual framework uses a scenario-planning like approach with two key factors, namely Context Readiness and Value Network integration. To test and refine the proposed framework and show its relevance for coming to an informed decision making, we used PAR (participatory action research). Dutch start-ups and stakeholders in Casablanca, Morocco, from healthcare sector were involved in the PAR. Using PAR, we could uncover that, for these cases, the use of Context Readiness and Value Network integration levels is necessary and sufficient for assessing the plausibility of emergence of leapfrogging opportunities and to decide on follow-ups. We learned that, the conceptual framework has to be used in two steps: a) at the given emerging market or a region in that market for a given sector, b) at the start-up level to assess the fitness of the leapfrogging opportunities for this start-up as policies and value networks integration may be different from case to case.

The proposed framework can be incorporated by start-ups managers and other practitioners and researchers into an internationalisation process design or in context-policy gaps analysis. As experienced in cases done so far, application of the framework, even at the level of the first cycles of a PAR (Piña et al., 2015), enriches the work on start-ups development in general and on the efforts for helping start-ups in arrested development status to survive and then to thrive.

While the relevance of the conceptual framework was demonstrated using start-ups in healthcare sector, it is designed to be robust enough to be used for different businesses from different sectors and in different contexts. We fully recognize the need for further work to refine the definition of the criteria used for the levels of Context Readiness and Value Network integration. It is to refine the accuracy of the prediction and the rigor of the framework. The PAR work is ongoing to achieve this.

It is important to mention that, beyond identifying an attractive expansion opportunity into an emerging market, entering a given emerging market as a start-up requires entering a value network in this market and considering institutional and resources aspects there. A process for doing this successfully was proposed by Khalil (Khalil, 2021).

Conclusion

With this work, we contribute to both knowledge and business development by proposing a conceptual framework that:

- Is a tool to be used by innovative start-ups or SMEs to sense and qualitatively assess the readiness of a given emerging market or a region in an emerging market to leapfrog to an innovative solution in a given sector. It can be used when considering expanding into an emerging market or when considering replicating a successful expansion realized in one emerging market in another emerging market.
- its two key factors, namely Context Readiness and Value Network Integration can be qualitatively considered as necessary and sufficient to come to an actionable result
- Is shown to be relevant and applicable to make informed decision prior to considering expansion into a given emerging market. This is expected to improve survivability of innovative start-ups or SMEs stuck in their own developed markets.

More work is ongoing to refine the pragmatic validity and reliability of the framework.

Table 2. Draft criteria used for the Context Readiness and Value Network Integration levels

	Context Readiness		Value Network Integration
	Policy	Payment	
High	Infrastructure, skills required for telehealth, policies for remote payment available	Healthcare coverage is widely available, and patients are able to pay for out of pocket care health costs	The members of the value network work together to optimise patient care. Ex. Pharmacists and clinical laboratories are integrated into the GP team.
Low	No policy related to or affecting Telehealth (Infrastructure, skills, payment)	No payment by third parties or alternatives to payment by cash	No direct interaction between Solutions providers , care providers , weak or no collaboration

Table 3. Results of the use of the conceptual framework for the four start-ups

Start-up	Patient Segment 1P	Context Readiness		Value Network Integration	Leapfrog Opportunity?	Actions worth taking
		Policy	Payment			
Tomas B.V.	Colorectal cancer	Medium	Low		Yes	Pilot, use early adopters
Avy	Rural, Mountainous and Remote: drug delivery, laboratory analysis	Low	Low	Low to Medium -	No	None
LIV	Cardiology, Atrial Fibrillation	Medium -	Medium +	Medium +	Yes, But	Pilot
HICA	CVA, Parkinson	Medium -	Medium	Medium +	Yes	V.P. Validation

CVA: Cerebral Vascular Accident ; V.P.: Value Proposition

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