

TRANSITIONING TOWARDS PLASTIC CIRCULARITY

VIETNAM'S NEW UPSTREAM FUTURE

A WHITE PAPER BY



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ABOUT THIS WHITE PAPER

The Ida C. & Morris Falk Foundation (ICM Falk Foundation) is a private, 501c3 family foundation that seeks to support innovation, entrepreneurship, and leadership that drives positive, equitable, and sustained impact for the world's communities and ecosystems. Building on the global commitment to the Circular Economy, the Foundation is now actively focused on the design and development of innovative solutions that contribute to the reduction of waste and pollution within Asia.

Established in 2016 and headquartered in Da Nang, Vietnam, Evergreen Labs is a purpose-driven, creative business lab solving pressing social and environmental challenges in emerging markets. With a team of future changemakers, Evergreen Labs innovates towards practical, targeted and localized solutions, whilst striving to push the boundaries of business towards triple bottom line and circular economy models.

Tackling the global plastic problem is only possible through circularity. In particular, innovations are needed across the plastics value chain, from production through to disposal. With a growing economy and high consumption of plastics, Vietnam is in a pivotal transition towards circularity. This report studies circularity with a focus on the *upstream innovation landscape within Vietnam and on identifying and investigating solutions and innovators tackling plastic waste*. The key insights and recommendations are based on the research and analysis of 45 solutions, and 70 intermediaries across the country, deeply involved in upstream innovation. A deep dive of 9 innovators were explored to provide first-hand accounts, expertise, and honest critiques of the current ecosystem. Additionally, this white paper took into account reports and updated landscape overviews to assemble a relevant and introductory level snapshot of the newly forming upstream innovation ecosystem in Vietnam.

Beginning in 2018, the upstream innovation ecosystem has seen rapid development over the past three years. This can be attributed to the recent global awareness surrounding circular economies and plastics pollution but more specifically, Vietnam's large contribution, both cause and response, to this burgeoning issue regionally. This report seeks to scope the current landscape of entrepreneurship within Vietnam to identify gaps and opportunities within the upstream subsector, for innovator, entrepreneur support (ESO) and funding organization action.

Upstream innovators are divided into three categories based on the Ellen MacArthur Foundation report, including Elimination, Reuse/Refill, and Material circulation (EMF Upstream Innovation 2020). This report is focused heavily on upstream innovation versus downstream activities, and as such, activities, including, amongst others, plastic recycling, were not the primary focus of this report.

By analyzing the nexus of innovation, design and business in this developing upstream sector, this report aims to delve into particular opportunities where innovation is high, investment points are low, and impact is sustainable. *This report will explore the current entrepreneurial and innovator landscape across the upstream sector in Vietnam to understand the opportunities, success cases of early pioneers, constraints and ecosystem players fostering circularity in this emerging market.*

ABBREVIATIONS

ASEAN	Association of Southeast Asian Nations	LCA	Life cycle analysis
CE	Circular economy	MONRE	Ministry of Natural Resources and Environment
COP26	Conference of the Parties 26th edition	PET	Polyethylene Terephthalate
DONRE	Department of Natural Resources and Environment	PPE	Personal protective equipment
ESO	Entrepreneur support organization	SME	Small to Medium Enterprise
F&B	Food & beverage	SUP	Single-use plastic
FMCG	Fast-moving consumer goods	URENCO	Urban Environment Company
FTA	Free trade agreement	VAN	Vietnam Angel Network
GHG	Greenhouse gases	VPA	Vietnam Plastic Association
HDPE	High-density polyethylene	VVCA	Vietnam Venture Capital Alliance

DEFINITIONS

B2B packaging and reuse	This includes individual companies reusing their own transport packaging to industry-wide reuse systems based on interconnected operators managing a shared set of standardised, reusable packaging.
CO2 equivalent	Abbreviated as CO2-eq is a metric measure used to compare the emissions from various greenhouse gases on the basis of their global-warming potential (GWP), by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential.
Competition hopping	Startups hop from competition to competition with no intention of starting a viable business.
Direct elimination	Packaging that does not serve an essential function is directly removed.
Decline stage	Startup or business has revenue, HR losses, or stopped operations altogether.
Early-stage	Startup has a legal business, a product developed, and few customers.
Elimination	This involves activities related to direct elimination or innovation elimination of plastic usage.
Exit stage	Startup owner sells the business.
Expansion stage	Startup is focused on adding new products and services to existing markets or expanding business to new markets and customer segments.

Green premiums	The additional costs of choosing a clean technology over one that emits a greater amount of greenhouse gases.
Green trust	The belief in the product, services, brands, or firms could bring positive impact on improving the environment and this is a main determining factor for consumers, especially when paying a higher price for the products.
Greenwashing	The process of conveying a false impression or providing misleading information about how a company's products are more environmentally-friendly.
Growth stage	Startup is generating consistent income and increasing the customer base.
Innovative elimination	Function is indirectly eliminated through innovation, with the function being achieved in a different way.
Intermediary	Organizations and programs that support entrepreneurship and business development including venture capitals, angel investors, NGO, competitions/ awards, incubators, accelerators.
Large enterprise	In Vietnam, a large enterprise is an enterprise with a charter capital of more than VND 100 billion (\$4.4 million USD) or with a number of employees over 300 people.
Material circulation	This involves activities related to plastic composting, plastics recycling, and plastic substitution.
Plastics composting	Plastic packaging is decomposed in a home or industrial composting facility, producing biomass, water, and CO ₂ .
Plastics recycling	Plastic packaging is broken down (mechanically or chemically) and the resulting materials are used to make new products (this excludes energy recovery and the use of the material as a fuel)
Refill at home	Users refill their reusable containers at home (for example, with refills delivered through a subscription service)
Refill on the go	Users refill their reusable container away from home (for example, at an instore dispensing system)
Return from home	Packaging is picked up from home by a collection service (for example, by a logistics company)
Return on the go	Users return the packaging at a store or drop-off point (for example, in a deposit return machine or a mailbox).
Reuse	This involves activities related to B2B packaging and reuse, refill at home, refill on the go, return from home and return on the go.
Seed stage (ideation)	Idea phase before the business is formed into a legal entity.
Substitution	Plastic packaging is replaced with non-plastic packaging (for example paper or aluminum), and designed for recycling or composting.
Upstream innovation	Rethinking products and services at the design stage to prevent waste from being created in the first place.
Venture building	Also called a startup studio, startup factory, or venture studio - an organization dedicated to systematically producing new companies using their own ideas and resources, which they help scale and succeed.

EXECUTIVE SUMMARY

This white paper is *Vietnam's first discussion on upstream innovation as a sustainable path to mitigate plastic waste and pollution*. This report highlights four key areas needing further attention and engagement by relevant stakeholders in order to rapidly transition Vietnam's linear economy into a fully circular and sustainable future.



1. Pre-consumer plastic alternatives (upstream) and circularity-based solutions are emerging globally and provide holistic, viable, and value-added impact towards addressing the plastics issue at scale.

The severity of the global plastics problem cannot be handled with downstream waste management alone and must be addressed in concert with upstream solutions that tackle waste at its source. These circular solutions provide new business and economic opportunities, meet the demand of consumers seeking sustainable alternatives, and alleviate pressure on developing, downstream waste infrastructure which is desperately lagging, particularly within emerging markets. Circular solutions can have a pronounced and compounded positive impact on reducing waste and pollution, when applied across multiple sectors beyond plastics, including notably within the Vietnam fashion and food/agricultural sectors. These solutions can also contribute a viable and sustainable, new revenue stream for Vietnam's economic growth.



2. Vietnam, in its efforts to manage the entire lifecycle (cradle-to-grave) of its plastic waste issues, is in critical need of increasing pre-consumer plastics (upstream) solutions to supplement its downstream-focused efforts.

Vietnam has observed explosive economic growth which has caused a dramatic increase in the uptake of plastics (10% increase year-on-year) (Ipsos Business Consulting 2019). With an increasing middle-income class and higher purchasing power, such a great economic success story has come at the expense of the environment. Vietnam's limited downstream waste management infrastructure compounds the pressure of mismanaged plastics and Vietnam has recognized that there is an urgent need to transition plastics towards circularity.

Regulatory improvements have been initiated in recent years to facilitate this transition including the Environmental Protection Law in 2020 as well as recent COP26 commitments made by Vietnam in 2021. Vietnam has acknowledged that despite focused efforts on downstream solutions, that alone, these efforts will not be sufficient to manage the level of plastic inflow entering into the system (World Bank 2021). Complimentary upstream solutions provide a pathway for Vietnam towards circularity by offsetting both new plastics inflows and in reducing the level of downstream waste to be managed.



3. Early-stage support systems for upstream innovators need to be patient, collaborative, iterative, and intentional in order to kickstart and achieve a successful, sustainable circular economy.

Upstream innovation in Vietnam is rapidly emerging with enterprises and innovators stepping in to become early pioneers of this new sector. The observed ecosystem is diverse with solutions tackling plastics upstream across packaging alternatives, reuse/refill models and biomaterials. Intermediaries, from incubators to investors and government associations, are fostering upstream innovation across the entire startup life cycle.

Despite the formation of a burgeoning and reputable ecosystem, efforts remain siloed, redundant, dispersed and divergent. As these innovators are early movers designing solutions for circular transition, they require multi-stakeholder driven, targeted, curated and longer term interventions to ensure success in achieving scale, impact and sustainability.



4. Upstream innovation is happening in Vietnam, and creative partnerships and early stage investment amongst non-traditional organizations pave the way to ensure early mover success.

The rapid development of the upstream innovation ecosystem in Vietnam highlights the opportunities towards assisting in the swift transition of the country towards circularity. To foster innovation and success in this dynamic landscape, creative partnerships, amongst non-traditional organizations are required to ensure a more intimate level of engagement with early movers.

This type of engagement is often correlated with the venture building approach. As a part of venture building, ESO-focused partnerships and collaborations occur between incubators, universities, accelerators and funders. Multi-stakeholder collaborations, led and supported by locally-driven, unifying and convening organizations, including philanthropic organizations such as the ICM Falk Foundation, provide entrepreneurs with flexible, targeted and longer term support including funding opportunities for piloting or scaling and onward, throughout their growth journey toward larger investment. Early stage investments must get creative and offer flexible incentives such as blended financing options, specifically via models such as results-based, small-scale grants to de-risk future investment opportunities.

PREFACE

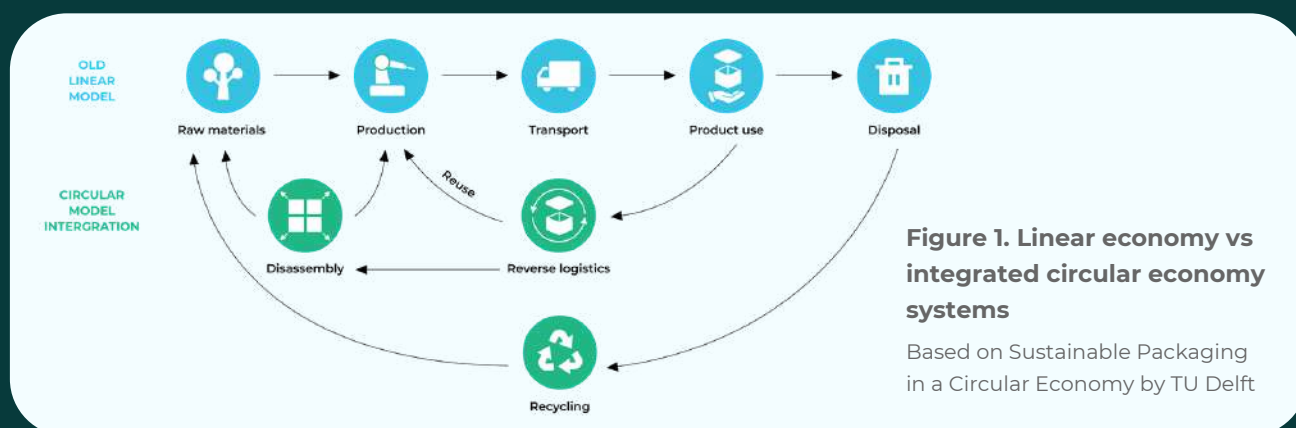
The plastic waste crisis is one of the greatest environmental disasters of our generation. This issue touches all lives, impacts all types of environments, and negatively affects our climate and natural ecosystems. It is estimated that plastic waste is causing over \$13 billion dollars of damage to marine ecosystems each year (UNEP 2014). The negative externalities from plastic waste are significant. They include the degradation of natural systems caused by leakage, greenhouse gas emissions from production & post-use incineration, and health and environmental impacts from plastics (Ellen MacArthur Foundation, New plastics economy). The world now produces 380 million tons of plastic annually, and it's estimated that 3% of this enters our oceans (Jambeck et al. 2015). By 2040, it is expected to triple, adding 23-37 million metric tons of waste into the ocean per year.

Economic costs associated with plastic pollution, particularly for marine environments, have been forecasted to reach up to \$33,000 USD per metric ton or an equivalent economic loss of \$500 billion to \$2.5 trillion per year (Beaumont et al. 2019). Much of this is attributed to the linear manner in which the world has historically sourced, processed and discarded materials. The linear economy model we have adhered to has led to the current repercussions we are facing in waste. It is now widely accepted that a circular economy approach is the only solution that can match the plastic pollution problem at scale (Pew Trusts 2020).

CIRCULARITY: RECOMMENDED SOLUTIONS FOR MANAGING PLASTICS IN THE FUTURE

Circular economy often gets confused with recycling and it is important to note that they are distinctly different. While recycling occurs at the end stage of the linear economy upon disposal and aims to preserve or increase the value of materials, the circular economy ensures the long-lasting lifecycle of products by substituting and/or maintaining products in the system through repair, re-assembly or refurbishment loops (Figure 1).

The *circular economy* is a transformative system, tackling the root causes of global issues (versus symptoms), while providing opportunities to grow jobs, address critical social needs, and combat emission, waste, and pollution. In considering circularity, the entire plastic system can be redesigned to avoid imminent environmental disasters caused by waste leakages, wasteful design and overt plastic consumption and production (Ellen MacArthur Foundation).



To implement circularity in the field, new design concepts have been developed. *Upstream innovation* refers to designing waste out of systems entirely and is now being thoughtfully considered in design around the world. Through conscious crafting, innovative thinking, and new materials creation, upstream innovation prevents waste from being created in the first place (Ellen MacArthur Foundation, Upstream Innovation 2020) (Figure 1). This concept lends itself to a new wave of entrepreneurship and design that pushes the barriers of business and creativity while simultaneously solving the waste and pollution crisis.

IMMEDIATE AND CRITICAL TRANSITION TOWARDS CIRCULAR ECONOMY FOR AN EMERGING ASIA

The need to consider and incorporate upstream innovation into plastic value chains has become urgent. Developing countries, particularly in Asia, face massive challenges as 45% of global plastic is produced in the region and overall contributes 82% to ocean-bound plastics (GA Circular 2017). Most of the mismanaged plastic that ends up in our oceans or environment is due to poor waste management practices – particularly in low-to-middle income ASEAN countries. Additionally, the Asia-Pacific region has seen a tremendous uptake in the use of plastic packaging, in particular flexibles or multi-layer materials (GA Circular 2017). These levels have been particularly pronounced during the COVID-19 crisis, with dramatic uptake of single-use plastics (SUP) and personal protective equipment (PPE) (ICM Falk Foundation 2021), and recent reports estimate eight million tons of pandemic-associated plastic waste have been generated globally (Peng, Y. et al. 2021).

Today, Asia is the fastest-growing market for flexible packaging, with over 42% of the global market share. In 2018, 855 billion sachets were produced worldwide, over 100 per year for each human alive. By 2025, multilayer food packaging will make up more than 70% of the market for food packaging in Asia (GA Circular 2017). These flexible materials currently have no recycling streams and therefore are not collected. Furthermore, their lightweight nature makes them prone to environmental pollution. Across the top five highest plastic consumption countries in ASEAN, Malaysia, and Thailand are at the top with the annual consumption per capita of 75.4kg and 66.4kg, respectively. Vietnam ranks third with 41.3kg per capita (Figure 2). The need for solutions, particularly upstream, is indisputable, and Vietnam, considered one of the world's leading emerging markets, aspires to reach upper-middle-income status by 2035, further accelerating the urgency (CSIRO 2019). This desirable growth, while economically improving people's lives, will come at the cost of our planet if upstream innovation isn't integrated into plastic systems now.



VIETNAM'S PLASTIC ENVIRONMENT & VALUE CHAIN

Recently, plastic has become a growing concern and a serious threat to Vietnam. There was a significant increase in Vietnam's plastic consumption per capita from 3.8kg to 41kg in the period 1990 - 2015, a drastic growth of 10% year on year (Ipsos Business Consulting 2019). This uptake has come from the rising increase in its middle-income class, higher purchasing power, and economic growth.

Unfortunately, waste management systems have not been prioritized or developed sufficiently, placing the country under massive environmental stress. Unlike developed countries, Vietnam's plastic value chain relies heavily on informal structures, possesses minimal infrastructure, and lacks household level separation. The complex and dynamic nature of the plastics industry and value chain has led to the slow adaptation of new technologies and innovation. In fact, in a recent study by the World Bank, Vietnam is estimated to recycle 33% of key plastic resins while up to 2.62 million tonnes of plastics are disposed annually resulting in a 75% loss of material value equivalent to \$2.2 billion (World Bank 2021). As seen in many ASEAN countries, the downstream waste ecosystem has evolved based on market demands and government engagement. Despite these downstream efforts, the country's limited recycling infrastructure and unsorted post-consumer waste prevent the material value to be captured post-use and instead, it is found at best, in landfills, many of which are basic open-pit dump sites, eventually leaching into groundwater systems.

VIETNAM'S BOOMING PLASTIC PRODUCTION INDUSTRY

Vietnam's plastic material flow is mainly managed under two ministries, the Ministry of Industry and Trade (MOIT) and the Ministry of Natural Resources and Environment (MONRE). The plastic industry has observed annual growth rates between 16-18% and is heavily dependent on international resources where up to 77% of raw materials are imported.

The development of the plastics manufacturing industry largely depends on the availability, price, and quality of imported resins (Vietnam Marketplace, 2019). According to the Vietnam Plastic Association (VPA), by 2023, the total volume of plastic input materials needed for production is projected to reach 10 million tons, where 26% will be derived from local sources and the remaining 7.4 million tons will be imported (VPA 2020).

The main reasons for the lack of local sourcing or integration of recycled supply chains are the highly fragmented recycling system, the lack of reliable feedstock, and the high contamination of waste, leading to poor and inconsistent quality with high price fluctuations (UNDP 2020).

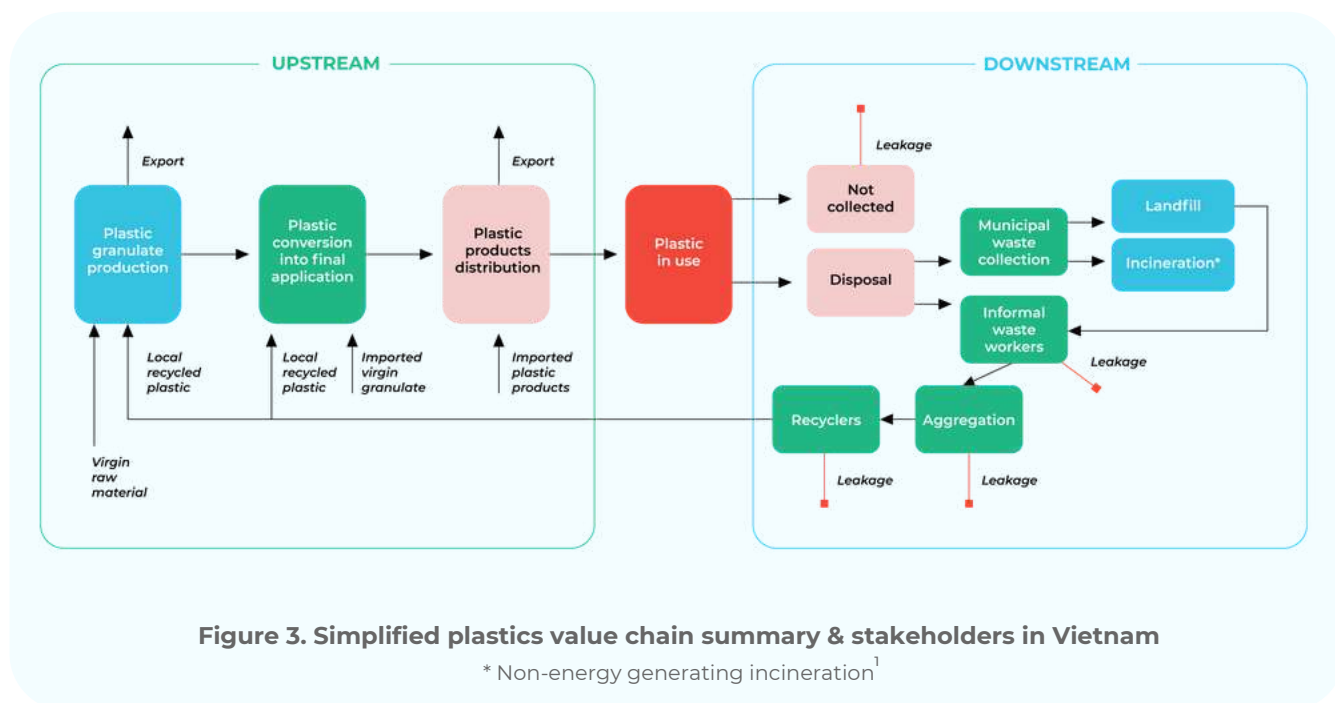


NAVIGATING INFORMAL NETWORKS AND LEAKAGE IN VIETNAM'S DOWNSTREAM PLASTICS SYSTEM

Vietnam's downstream plastic value chain is a multi-stakeholder network of informal collection, municipal engagement, logistics, and disposal. Post-consumer plastic enters the downstream chain through unsegregated household disposal. Informal, freelance waste workers rummage through household bins to scavenge the tradable materials, including metal, PET, HDPE, and paper. All other materials, including remaining plastics, are collected by municipal solid waste handlers. According to the National Environment Report 2011-2015, the rate of household solid waste collection in urban areas reached an average of 84-85% (MONRE, 2015).

The informal system is built on long-standing relationships. Informal workers have relationships with municipal workers and local businesses to ensure the first pick of the waste. These partnerships are crucial as their livelihoods depend on the total volume collected. These workers, who are typically women in Vietnam, have flexible working schedules, allowing the parallel management of their households and children (UNDP 2020).

Workers trade at local collection centers where the material is aggregated upon collection before being traded up in bulk to aggregators and then processors. Most collection centers and aggregators do not have supporting infrastructure such as balers, adding inefficiencies to the already complex collection leading to high transport cost, which is reflected in the price of recycled materials (UNDP 2020). Due to the highly dynamic nature of this system, price fluctuations are common and unpredictable. Leakage of plastics into the environment is common with informal systems due to lack of equipment, awareness, and education (Figure 3).



REGULATORY IMPROVEMENTS TO FACILITATE CIRCULARITY TRANSITION IN VIETNAM

Recently, Vietnam's observed plastic upstream and downstream value chain has been subject to regulatory improvements. Notably, regulations published between 2019 to 2021, especially the Environmental Protection Law in 2020, aim to pave the way for many imperative policies (Figure 4). Vietnam has pledged to meet three major targets by 2030: reduce the flow of plastics into the ocean by 75%; eliminate single-use plastics and non-biodegradable plastic bags from coastal destinations, and ensure that marine protected areas are free of plastic waste (WEF 2020). During COP26 in 2021, Vietnam committed to reaching its net-zero carbon emission target by 2050 and called for fairness and justice in climate change issues (Vietnam Briefing 2021).

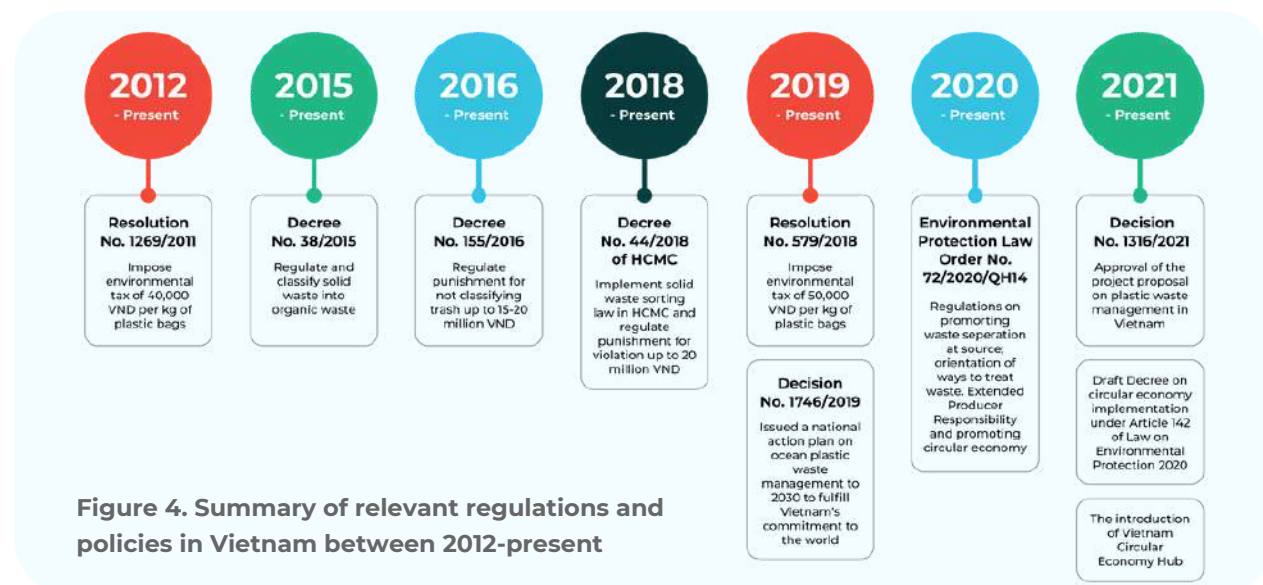


Figure 4. Summary of relevant regulations and policies in Vietnam between 2012-present

THE NECESSARY UPSTREAM FUTURE FOR VIETNAM

The progress being made to handle Vietnam's waste crisis is apparent, and recent regulatory improvements highlight the country's prioritization of these issues. The forecasted plastic consumption in Vietnam will continue to expand with an annual growth rate of domestic municipal solid waste of 11.7% (Vietnam Marketplace 2019). *While many stakeholders flood in to solve pressing downstream challenges as mentioned above, it is clear that downstream solutions alone will not suffice to solve the plastics issue.* A recent analysis by Pew Trust noted that a progressive downstream collection, sorting, and recycling infrastructure paired with design for recycling can reduce 2040 leakage by 38% (relative to business as usual).

While an ambitious reduction and substitution strategy, without expansion of downstream infrastructure, reduce 2040 leakage by 52% (Pew Trust 2020).

This data highlights the positive consequences of providing solutions both up and downstream, notably the dramatic impact upstream solutions can have on plastic reduction entering the system from the outset.

Upstream solutions are necessary to provide a waste-free future. When paired with downstream activities which tackle existing plastic waste, upstream solutions provide the pathway for the future of circular plastics. Early movers have an undeniable opportunity to provide upstream solutions to tackle plastics at the source. The additionality of targeting both ends of the plastics value chain in Vietnam will not only bring economic benefits but also provide forceful, systemic change to solve the plastics problem altogether.

VIETNAM'S UPSTREAM MARKET OPPORTUNITIES

Vietnam has transformed from one of the world's poorest countries in the 1980s to reach lower-middle-income status by 2010. Today Vietnam has a total population of 98 million, its life expectancy is increasing, and it maintains a vibrant, median population age of 30. The GDP of the country continued to grow despite COVID-19 in 2020 to reach 271.2 billion USD. With aspirations to reach high-middle-income-country status within the next decade, Vietnam has become an overall, economic success story (CSIRO 2019).

VIETNAM'S TRANSFORMATION TOWARDS SUSTAINABILITY

Consumers are transitioning towards both comprehension of and movement towards sustainability. It was reported that 81% of consumers surveyed intended to purchase more biodegradable or eco-friendly products (Minh-Ngoc Nguyen 2021). Similarly, while investigating the purchase behavior of young consumers in Vietnam, there is a desire for green packaging and products but these innovations need to consider sustainability differentiation from similar fast-moving consumer goods (FMCG). As environmental concerns, knowledge, and green trust levels are high, there remains a strong positive attitude towards green packaged products (Nguyen, N. T. 2021).

Building green trust in Vietnam is a priority to ensure clear messaging, end-of-life analysis, and uniform & targeted communication while consumers consider various purchasing options including those of more expensive green alternatives. While greenwashing continues to exist, consumers continue to become more aware of its prevalence and in turn, more cautious when making their green purchase decisions.

However, these market discrepancies allow for opportunities for upstream innovators to build a well-defined brand that communicates its advantages, environmental benefits, and overall competitiveness over their potentially greenwashed competitors. Notably, in Vietnam, this "green" sector is strewn with misleading vocabulary that causes purchasing behavior that doesn't, in reality, benefit the environment. Particularly within alternative materials, the technical complexity, such as chemical compositions of materials, can be challenging for consumers to grasp (Figure 5). As the upstream sector is in its infancy, low consumer awareness is expected, but provides an empty slate for entrepreneurs to define their products clearly to consumers while simultaneously educating the market on circularity.



Credit: Tuoi Tre News

DOMESTIC MARKET OPPORTUNITIES FOR PLASTIC ALTERNATIVES

The Vietnamese domestic market provides various opportunities for upstream products, and many customers, particularly sustainability-focused organizations and businesses seeking alternative products to plastic, are actively seeking out such solutions. With limited solutions available on the current market, there is a large opportunity to capture market share.

For example, hospitality chains have global commitments to phase out plastic in all of their operations by a given deadline. Therefore, their procurement offices are actively seeking solutions to meet those headquarter based targets.² In addition to the developing domestic market, there is potential for more opportunities for green products within export markets. Many innovators in this study, particularly within the substitution subcategory, export their products to Europe and other markets offering high demand for their plastic-substituted products.

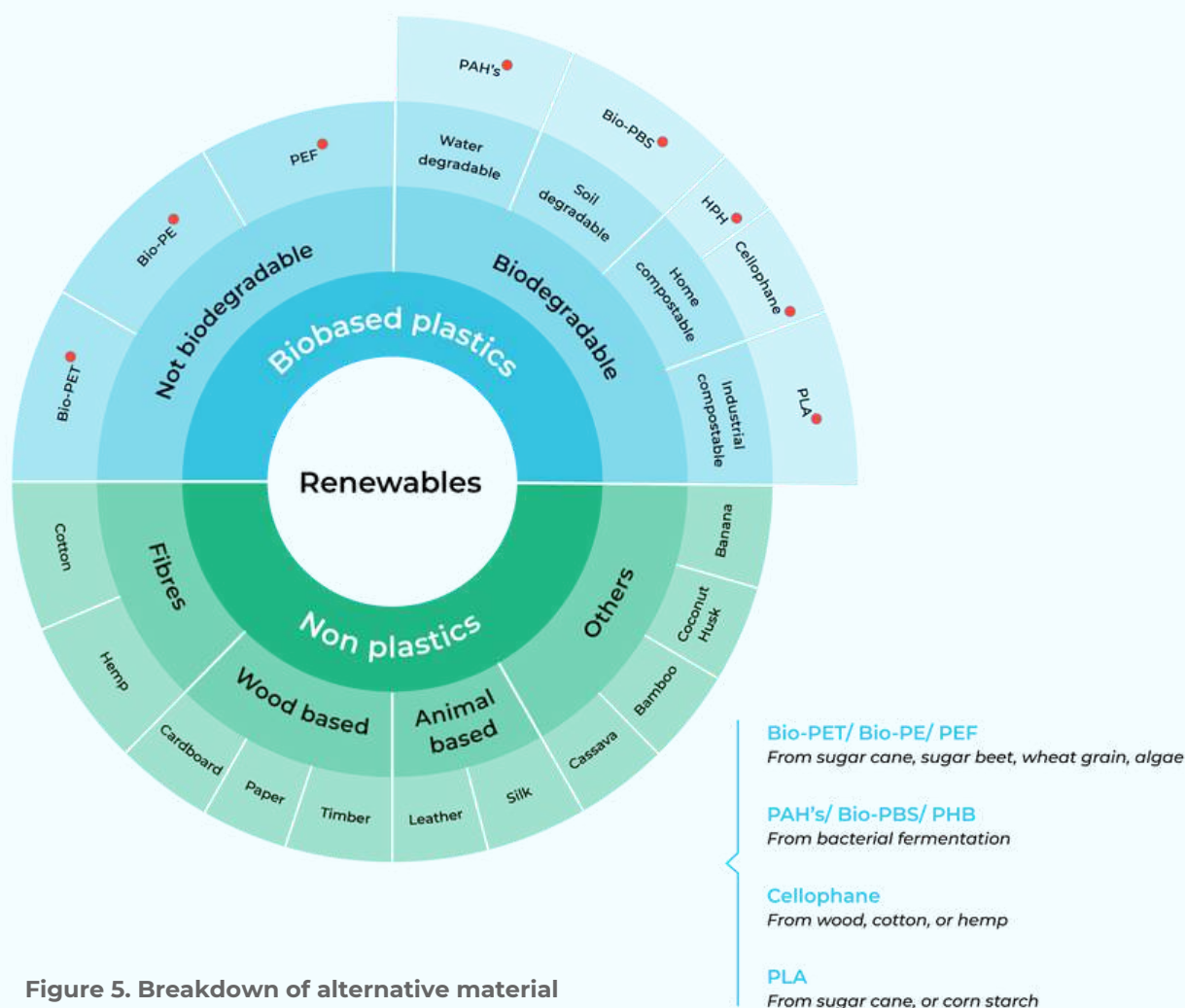


Figure 5. Breakdown of alternative material categories contextualized to Asia raw materials

Adapted from "Sustainable Packaging in a Circular Economy" course by DelftX SPCEX

VIETNAM'S ENABLING BUSINESS ENVIRONMENT

Vietnam has made strides in improving the overall business environment. According to the World Bank's Doing Business report, Vietnam ranked 70th out of 190 economies which have made impressive progress compared to its position of 90th in 2010. Overall, Vietnam ranks below 100 in the four main categories: starting a business, paying taxes, trading across borders, and resolving insolvency (World Bank 2020).

Many businesses, however, remain in the informal sector to avoid potential risks or obstacles still present in the Vietnam business environment such as access to land and formal tax regimes. As described earlier, many supportive policies and regulations have been introduced from 2018 to now. 2022 will be a critical year for innovators to grow as this is the first year that the updated Environment Protection Law comes into effect.

With the commitment of Vietnam to the international community with regards to marine plastics and emission reduction, many more supportive policies and regulations are expected to follow in the coming years.

Free trade agreements (FTAs) also play an important role in helping Vietnam move up the value chain in a number of sectors and supporting high-skilled jobs and knowledge transfer. Vietnam is expected to have a more significant contribution to the global and regional manufacturing landscape with regards to textiles, garments and apparel, as well as hi-tech sectors such as electronics (KPMG 2020). With opportunities available both in the domestic and export markets, Vietnamese innovators are ideally positioned to become manufacturers and distributors within this thriving sector.



GAPS & OPPORTUNITIES IN VIETNAM'S EMERGING UPSTREAM INNOVATION ECOSYSTEM

Taking everything into account, there is an urgent need for upstream innovation to provide support to Vietnam's circular transition in plastics. The entire value chain remains in its infancy, and together with the new regulatory improvements, can provide for untapped business opportunities in upstream innovation. While this report recognizes the multitude of stakeholders currently active in this sector in Vietnam, its focus remains on highlighting the existing upstream ecosystem in Vietnam while simultaneously spotlighting innovators and the support ecosystem within which they operate.

Startups are the driving force of innovation in this emerging sector, pushing the boundaries of traditional manufacturing and business models as a whole. While large enterprises have begun to engage in these topics, they are not necessarily focused on upstream design and development, oftentimes relying on startups to provide design horizon solutions. Conversely, early-stage innovators and startups are actively designing circular economy concepts into their products and services, directly avoiding the complex retrofitting of circularity into the existing operations of established companies.

VIETNAM'S ADVANCING UPSTREAM INNOVATION LANDSCAPE

The upstream solutions landscape in Vietnam is diverse and rapidly emerging (Figure 6). Despite its recent development, an observable ecosystem is forming across the country. In total, for this study, 45 solutions were identified and ranged from material circulation innovations (compostables, bioplastics) to reuse models and elimination enterprises.

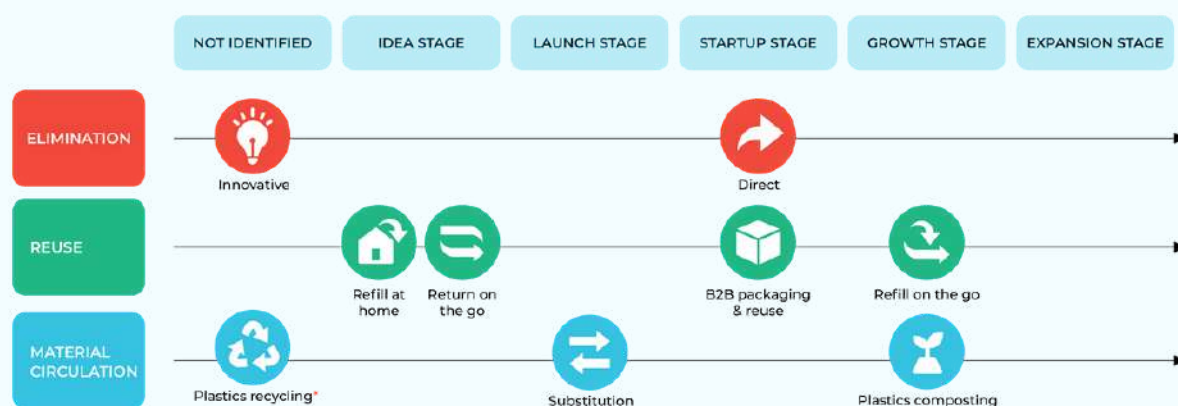


Figure 6. Upstream solutions landscape in Vietnam

*Plastic recycling was not studied in this report

Promising upstream, entrepreneurial ecosystem development in Vietnam

Amongst the 45 uncovered solutions in Vietnam, *material circulation businesses were the most common category identified, comprising over 71% of solutions identified (Figure 7)*. These solutions were found across the innovation life cycle with a majority (41%) in the ideation and launch stage (Figure 8). Within this category, the solutions and businesses provide either compostable materials or alternative biodegradable materials for plastics from various agro-waste including shrimp shells, coffee waste, cassava starch, sugarcane bagasse, banana stem, pineapple tree, areca leaf, grass, etc. The overwhelming number of agro-waste-based solutions may stem from the existing abundance of agriculture byproducts and the producer's familiarity with natural materials as the agriculture sector contributed to 14.85% of Vietnam GDP (Statista 2021).

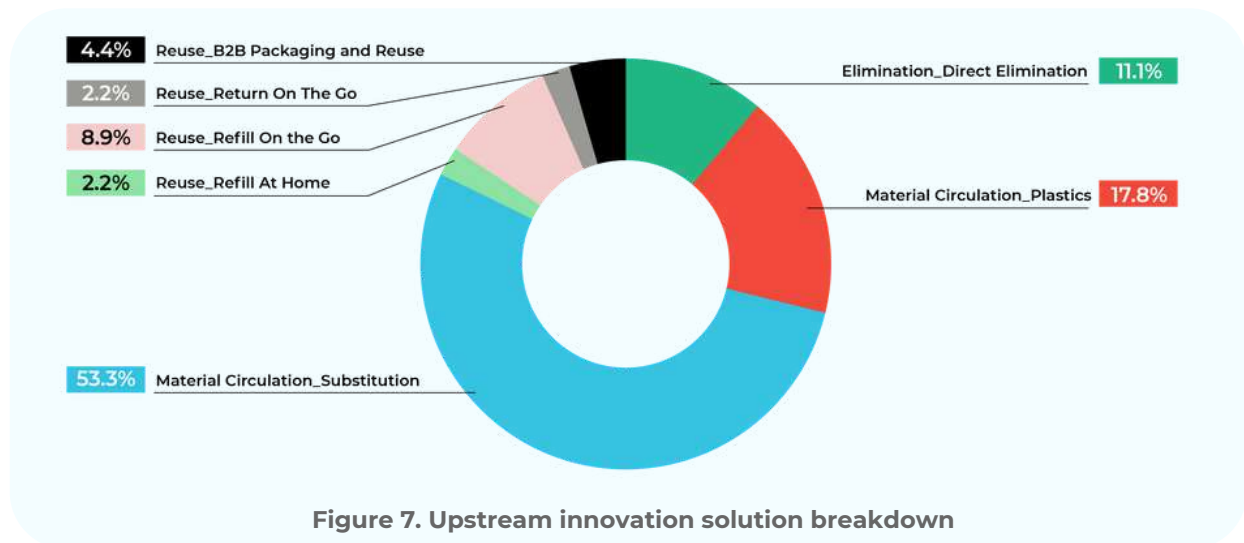


Figure 7. Upstream innovation solution breakdown

However, only 18% of solutions observed fell into the reuse/refill category. The limited number of reuse/refill innovators were spread across various lifecycle stages with no particular concentration of solutions at any given stage (Figure 8). This, despite relatively minimal innovation entry barriers and the least amount of externalities in comparison to other upstream categories, was observed throughout the country. An increasing number of refill/reuse stores observed in Vietnam, albeit scalable models, were still not identified. Based on first-hand accounts into these business models, it remains too early to state the domestic market demand for such reuse models in Vietnam.

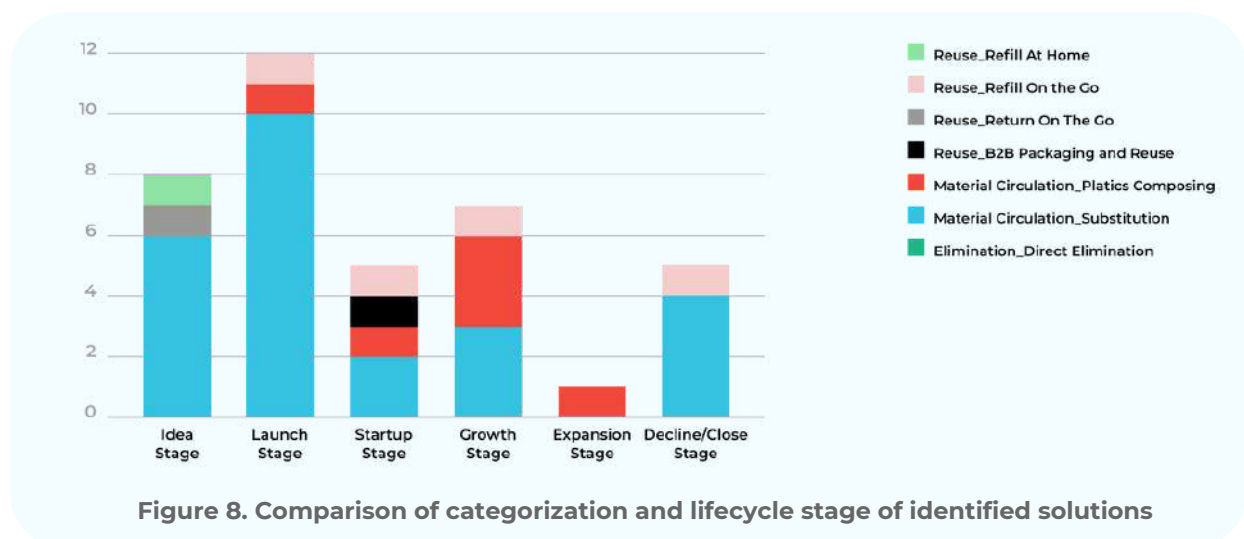


Figure 8. Comparison of categorization and lifecycle stage of identified solutions

Constraints to early mover traction

In-depth interviews with innovators spotlighted resounding themes amongst upstream innovators in Vietnam. Despite these solutions being at various stages of development and from different categories, their commonalities highlight gaps for intervention and opportunities to leverage.

Upstream innovators attempt to penetrate the market but lack clear strategy, market knowledge and understanding of customer needs.

For example, alternative material innovators with products such as cassava-based bag replacements are unable to capture the current domestic market as interested buyers need low volumes (i.e. local conscious shops) but larger buyers are not interested due to high green premiums (i.e. large supermarkets). This discrepancy was commonly observed and mentioned as a key challenge by innovators (Figure 9).

Startups in the upstream sector also face unique operational challenges that can prevent scalable business models.

Of these issues, logistics remains a key barrier in Vietnam (Box 1) and in particular, for upstream enterprises, implementing reverse logistics becomes a heavy cost position. Another operational challenge for reuse/refill models in particular includes corporate engagement and brand partnerships.

For successful models at scale, reuse/refill business models must be able to engage with well-known brands that consumers trust and are seeking in order to switch their purchasing behavior. The success, scale, and uptake by the local market require brand partnerships leading to slower growth for refill/reuse innovators.

Box 1 Upstream business models face many challenges surrounding reverse logistics in Vietnam

In Vietnam, reverse logistics³ remains a new concept, and logistics costs are high compared to other Asian countries, which may explain why the reuse/refill solutions remain uncommon.



Reverse logistics is starting to be available for electronic components (high economic value), but not for other sectors yet. Also, logistics service cost in Vietnam remains high - equivalent to 20.9 percent of its GDP, much higher than other countries in the region, like China, Malaysia, Philippines, Thailand, and Singapore. This cost is almost double that of developed countries and 14 percent higher than the global average. Transport costs remain high, equivalent to 30-40 percent of the product cost, while this ratio is only about 15 percent in other countries (Vietnam Express 2020).

Inadequate support from intermediaries causes slow growth of upstream innovators

Many solutions for alternative materials cannot identify suitable industrial, commercial or association partners to directly support their business operations. While matchmaking could be offered together with targeted programming from the intermediary entrepreneurial support organizations (ESO), such curated programs designed for upstream and circular innovators were not identified.

For example, a bamboo products manufacturer identified in our research, whose products ranging from utensils to shelves, was seeking connections to relevant trade associations for each of their offerings - but in vain. Lack of access to relevant networks remains a critical pain point for innovators which ultimately inhibits their business development and growth. Specifically, intermediaries, including investors, lack technical or industry expertise that innovators can leverage which in turn also limits essential network connections. Eventually, upstream innovation entrepreneurs' asks and intermediaries' offers cannot be fully aligned due to this inherent mismatch of expectations, leading to limited success of support programs.

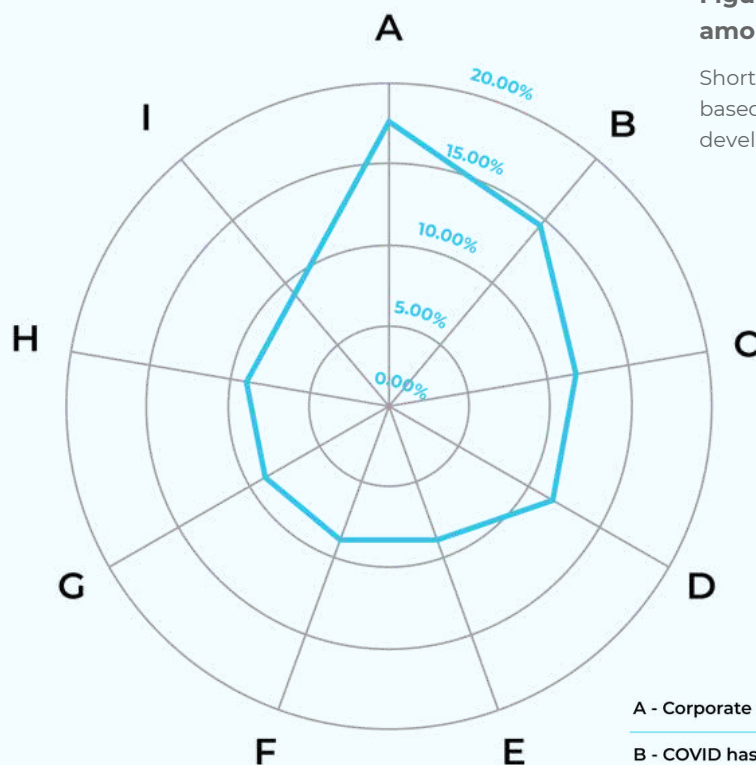


Figure 9. Common challenges shared among innovators interviewed

Shortlisted solutions were selected for interviews based on sustainability, end-of-life, and business development

- A - Corporate engagement & partnerships
- B - COVID has put strain on budding entrepreneurs in this sector
- C - High green premiums perceived by buyers
- D - Mismatch with market demand (too low volume, too diverse)
- E - Understanding of certifications & becoming certified
- F - High logistic costs and complex logistics operations
- G - Difficulty with building a team at the early stage
- H - Competition from big green players or other alternatives
- I - Vocabulary about plastics (composting, degradable)

GROWTH OF VIETNAM'S UPSTREAM INNOVATION SUPPORT ECOSYSTEM

Despite the identified gap of intermediary support mentioned by upstream innovators, this research observed a flourishing ecosystem, with 70 intermediaries identified. Of the identified intermediaries, 34% were competitions/awards, 22% NGOs, 13% incubators, 6% accelerators, 13% government agencies, 12% venture capital, and angel investors (Figure 10). Over one-third of these intermediaries focus their efforts on early stages of development such as discovery and ideation, while support for product launch and validation phases were limited. There has been continual growth in this sector with 23 out of 70 intermediaries (32%) established within the past two years.

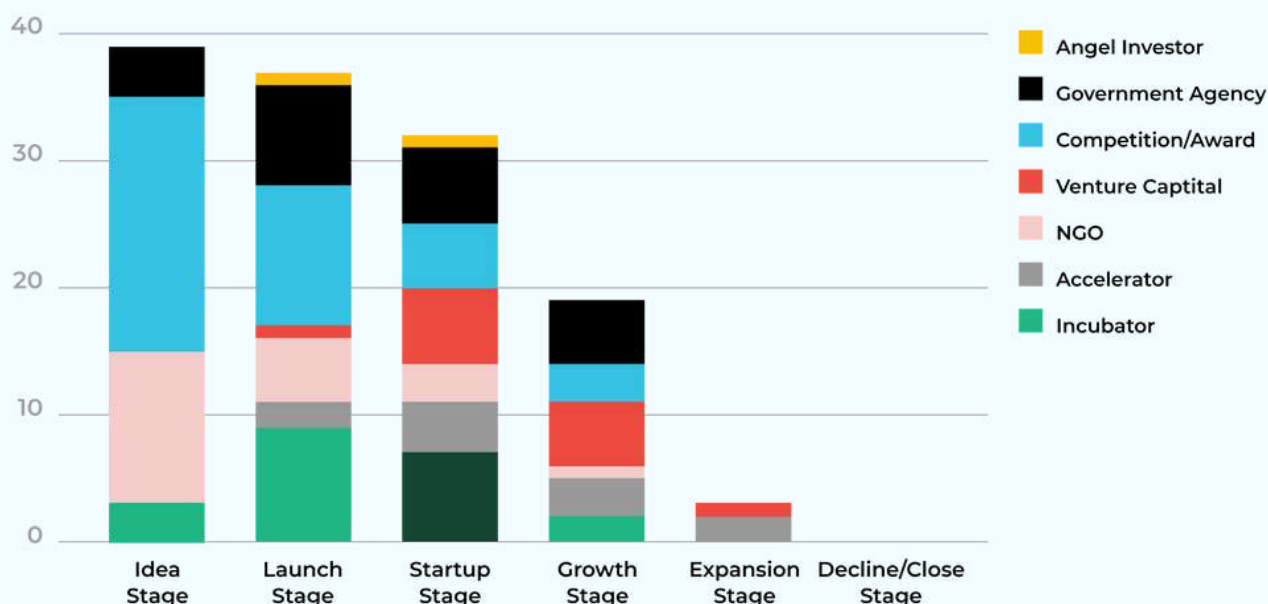


Figure 10. Intermediary support for upstream innovators across lifecycle stages

Burgeoning investment landscape for upstream innovators

Given the sector's recent emergence, the investment landscape remains nascent, with room for early movers to support innovators. Intermediaries, including funders, play a crucial role in developing startup ecosystems and offer a wide range of services to support and foster product & service innovations at various stages of development. In the case of upstream innovation in Vietnam, 31 funders were identified (including funding competitions). Despite the high number of funders and donors identified the majority of these fell into the competition of awards⁴ category (74%), with venture capital second (23%) (Figure 11). This research identified seven VCs supporting mature enterprises and one angel investor supporting early stage startups in the upstream sector.

Considering the current regional impact investment trends, foreign investment funds have started entering the plastics sector. Specifically for the sector of plastic reduction, we identified the first venture capital focusing on plastic reduction in Southeast Asia founded in 2019 - The Circulate Capital Ocean Fund (Green Queen 2019).

Circulate Capital is also supporting a multi stakeholder and regional support platform, the Circulate Initiative, a non-profit organization that incubates, measures and amplifies inclusive waste management and recycling solutions. While these efforts are focused on downstream activities, it provides a good starting point for stakeholders. In fact in 2021, upstream-focused programming was observed by The Incubation Network, an initiative by The Circulate Initiative and SecondMuse, who hosted the “Future of Flexibles” challenge targeting upstream innovators across the globe.⁵

Vietnam, in particular, has observed a budding investment landscape. According to 2020 data, *foreign investors in Vietnam mainly focus their investments in 18 fields with 5 key sectors* such as processing and manufacturing industry, real estate business, and accommodation and catering services and construction (Crowe, 2021). Additionally, digital transformation sectors in particular began to dominate the investment landscape in Vietnam, including MedTech, HRTech, EdTech and SaaS (Doventures, 2020). Besides foreign investment funds, a rising number of domestic funds⁶ have been established in the past two years. Funding activities are increasingly interconnected and structured with the foundation of Vietnam Angel Network (VAN) in 2018 and the foundation of Vietnam Venture Capital Alliance (VVCA) in 2020. Taken together with the report findings, the Vietnam investment landscape has continued to adapt and follow global and regional investment trends with investments becoming more impact-focused. *However, without having a narrow scope in circular economy or upstream innovation in particular, this further emphasizes the slow transition and engagement in these sectors by investors.*

With more investors looking to enter the market in Vietnam with rising trends of circular economy and upstream innovation, there is still some hesitation on deployment methods and investment restrictions. Primary financial instruments being deployed in Vietnam for upstream innovators include traditional debt, equity, and convertible notes. Blended financing options were also observed in particular innovative, international grant programs that pivoted from traditional research project funding towards capturing innovations for sustainable business development. *However, with the development of the funding landscape for upstream innovators in Vietnam recently, a large funding gap remains particularly for risk and patient capital reaching these innovators.* Capital transfer and foreign ownership restrictions also limit the number of foreign investors in Vietnam, thereby diverting Vietnam-centric investment opportunities to more investor-friendly regulatory environments such as Singapore (Freshfields 2021). Further research into both the constraints and solutions in creating a more robust enabling environment for upstream investments in Vietnam would help enhance and support the growth of this sector.⁷



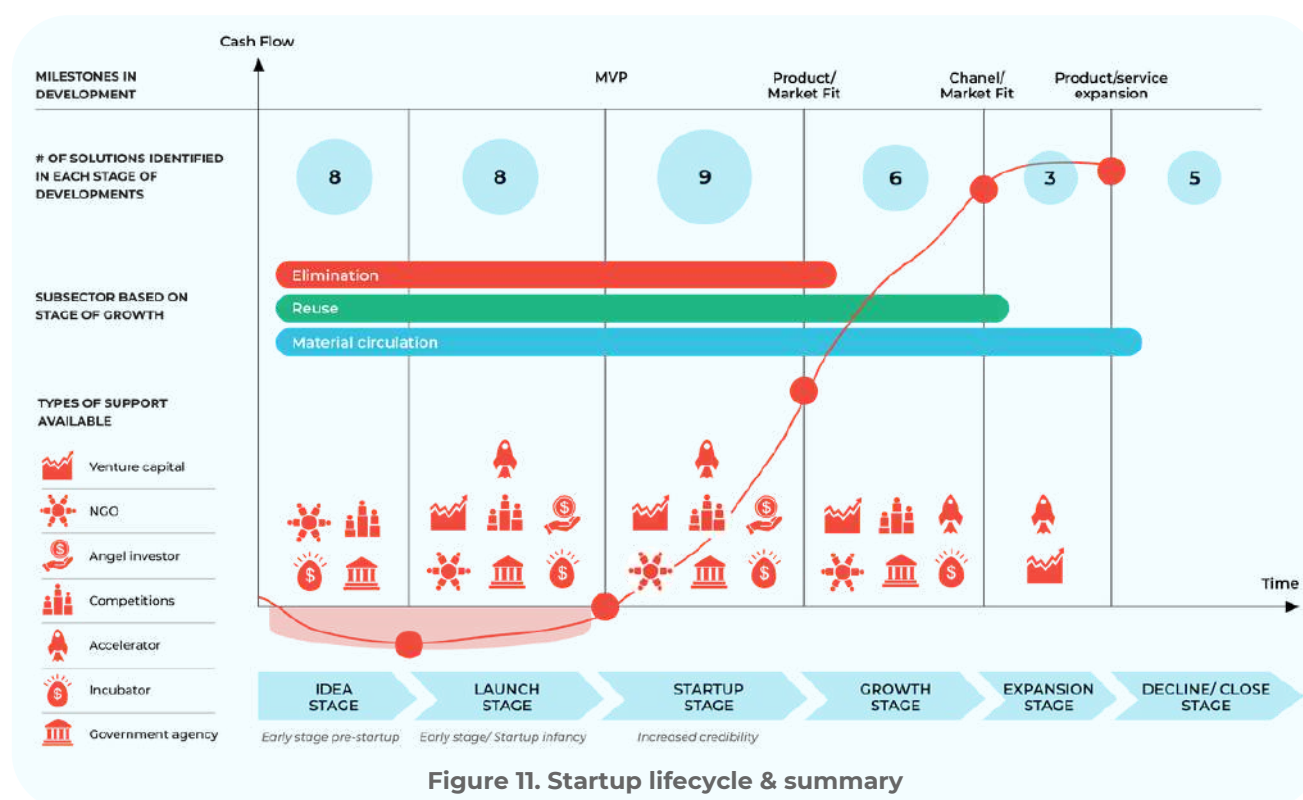
Credit: CafeF

Technical support for progressive innovators

Vietnam's upstream innovation ecosystem has started to flourish with multi-stakeholder involvement, including investment, across various stages of development. *Despite the abundance of entrepreneur support organizations (ESOs), very limited tangible support is effectively provided for upstream innovators*, including funding, infrastructure, technical expertise, and commercialization partnerships. The usual one-size-fits-all approach is inadequate when supporting circular innovation and leads to gaps in the program design. Standard programming (i.e., classic incubation programs for tech startups) is mostly deployed, *often lacking curated support targeting the diverse needs of upstream innovators or entrepreneurs* (i.e., technical guidance), as well as multi-year approaches with adequate infrastructure particularly in universities (Box 2).

Moreover, this research observed a large number of competitions and awards for upstream innovators; early patterns of “competition hopping” have been cited. This reveals that stand-alone competitions are not sufficient and need to be closely linked to other programs to be successful in driving sustainable business creation. Primary research uncovered that besides financial support, entrepreneurs are seeking market connections, commercialization partners, and pilot partners.

In summary, the upstream innovation ecosystem is emerging and growing with a multitude of stakeholders engaged throughout the innovation lifecycle (Figure 11). The growth of innovators and entrepreneurs in this sector highlights the transitioning market, mindsets and demands for circular products and services. With the recent emergence of this ecosystem, there remain key gaps to address, in particular providing innovators with targeted support, collaborative programs and market-driven guidance they need to flourish.



LESSONS LEARNED: OPPORTUNITIES IN IMPLEMENTING UPSTREAM INNOVATION

Aimed at transforming the plastic system in its entirety, circularity and in particular upstream innovation has been developing in Vietnam thanks to the emergence of innovators, entrepreneurs, and support ecosystems. With the extensive market opportunities, improving regulatory and enabling environment, and shifting consumer mindsets, Vietnam has tremendous potential to pave the way for plastic circularity in Asia.

This research has highlighted the gaps in the current ecosystem in order to inspire change within current actors as well as encourage new intermediaries to step in and successfully support budding upstream innovators in Vietnam. In order to meet the needs of entrepreneurs and build an overall thriving ecosystem, intermediaries need to get inventive in their approaches to program design, development and implementation.

Design and unique support programs targeting upstream entrepreneurs

ESOs are traditionally critical stakeholders that provide guidance and foster innovation throughout the lifecycle journey. In the case of upstream innovators, *it is imperative that these intermediary organizations adapt their programming to suit the needs of these novel innovators*. During design stages, ESOs must undertake thorough market research, to craft a market-driven and unique program. This level of due diligence can provide a deeper understanding of existing entrepreneurship support programming in order to avoid replication, as well as an active understanding of climate entrepreneurship requirements - ranging from strong networks of engineering experts to corporate, industry and SME partnerships. This stage of design research can also provide ESO's with the opportunity to broaden out into learning about other regional programs, solutions and overall landscape, eventually leading to better program design with aligned approaches to successful incubation and acceleration programs abroad.

ESOs in this research were also commonly observed to be unfamiliar with business or market-based approaches. Their deployed stand-alone programs would have the general target of incubating impact entrepreneurs with limited industry focus (e.g., agriculture, clean energy, waste management) or startup maturity mismatch (i.e., products and services within a cohort would be at very different growth phases, ranging from low-fidelity prototypes to launched solutions). These programs with flawed initial cohort journey design usually led to discrepancies between ESO's offerings and their cohort's actual needs, eventually ending with limited program success.

For sustained innovation within the upstream sector, intermediaries such as ESOs need to become more selective and collaborative within their field of work. Selecting a category within environmental impact would help to deploy more cohesive mentorship and technical support, while also focusing on incubating complimentary early-stage solutions that could create an umbrella of holistic solutions within the same cohort. The development of targeted, innovative programs applied across the lifecycle stages of innovation, as well as across categories of upstream innovation, is key to building a healthy funnel for circular innovators and entrepreneurs to ideate, prototype and launch necessary solutions to the current plastic crisis.

Collaborative support for students during discovery and incubation

At the early stages of development, ideation typically takes place within universities in Vietnam. Similar to other entrepreneurial support programs, *innovative program design with a multidisciplinary collaboration is also required for building successful upstream innovations in Vietnamese universities* across all lifecycle stages and subcategories of innovation. Building capacity within the ideation phase posits a higher possibility for long-term success for upstream innovators who can stay nimble in adjusting and pivoting their solutions. University-based technical training, equipment, and support (including mentorship, networking, and team-matchmaking) are just some of the critical elements necessary to tangibly support these budding entrepreneurs. Within a multidisciplinary approach, university-based support also extends to on-site training and collaborative partnerships between universities, incubators and funders directly (Box 2). *Strengthening an approach similar to a venture-building format would create a holistic growth funnel for young entrepreneurs to benefit from various stakeholders' support and input from the discovery stage to their eventual launch day.*

Box 2 ICM Falk Foundation collaboration with Bach Khoa University

In 2021, ICM Falk Foundation co-funded a student-led, innovation competition at a leading engineering Ho Chi Minh City university to develop two projects for alternative compostable cassava-starched material development for plastics packaging replacement. The two projects were provided support via local incubation programs (C-Plastics Incubator 2021) to bolster in-depth business and technical support. This collaborative approach between funders, universities, and ESOs highlights the benefits students receive from a holistic support system (ie: from idea, launch, startup, and beyond) with offerings ranging from mentorship to funding and networking opportunities that continue throughout their R&D journey. Through the facilitation of such university-driven, diverse partnerships and associated flexible funding, students were able to begin at the discovery level and leverage external support organizations (incubation) to realize their full potential.

Key takeaways from this multi-stakeholder approach include:

- Support organizations need to invest in multi-year programs with business mentoring, 1-on-1 coaching, flexible funding mechanisms, and technical experts adapted to the specific needs of innovators (eg. biomaterials/climate solutions).
- Youth-focused offerings need to be more than just cash prize money in order to attain impactful results and a continuing, self-sustaining entrepreneurial funnel.



Pictures provided by Edifilm and Blastic teams

Rethink investments & support for entrepreneurs

Through multidisciplinary collaborations and daring programming across the ecosystem, upstream innovation can thrive. In Vietnam, the ICM Falk Foundation has established a key partnership with Evergreen Labs, a social venture builder tackling plastics across the value chain. This strategic partnership highlights a flexible and collaborative partnership between a private philanthropic organization and a local social enterprise within the Upstream Innovation sphere to grow the circular economy by:

1. Generating new on-the-ground and country-specific awareness and knowledge about circular, upstream innovation
2. Piloting and scaling up circular ideas to unlock new value and to bridge the zero waste gap (Box 3)
3. Co-building the local ecosystem to leverage more integrated, circular efforts within the plastics sector and beyond

By leveraging holistic support from funding to collaboration opportunities, this partnership aims to influence and impact system-level change in Vietnam and the region towards sustainability and circularity. Moreover, this partnership stands out in particular due to its unique funding structure. In this partnership, development grants are provided by a private entity, in-kind contributions are made by recipients including knowledge sharing. *Together, this partnership provides a flexibly funded, launching platform for local-centric solutions and scaling models (Box 3) with the potential to create systemic change in Vietnam.*

While partnerships and collaborations can boost ecosystem development, all stakeholders are responsible for shifting their mindsets accordingly when entering a new era of design, business creation, and entrepreneurship. It was evident throughout this research that there is a mismatch between the needs of entrepreneurs and the demands of funders. On the one hand, many entrepreneurs want to be matched with industry partners or be supported with product development and commercialization but are often unwilling to give up equity for such benefits. While on the other hand, funders remain risk-averse towards novel upstream entrepreneurs due to the nascent nature of their solutions in Vietnam. Therefore, *becoming more creative in these markets and sectors is essential to provide entrepreneurs with blended financing options such as convertible debt and entrepreneurship-focused grants.* All ecosystem players must adapt and evolve to provide better support services for upstream entrepreneurs to thrive and innovate.



Box 3 ICM Falk Foundation collaboration with Evergreen Labs - Glassia

In early 2021, the ICM Falk Foundation partnered with Evergreen Labs to foster circular and upstream innovations in Vietnam. Through the strategic partnership, the ICM Falk Foundation grant program supported one of Evergreen Lab's social enterprises, [Glassia](#). Developed and established by Evergreen Labs in Da Nang, Glassia is a solution to eliminate plastic waste at the source of glass bottled water. Glassia transforms the linear water bottling value chain into a circular system of "re-collection – sterilization – refill" through an integrated, local, and decentralized model of glass bottling facilities. It produces and distributes high-quality drinking water in glass bottles, as well as delivers and re-collects the bottles in the local areas. The model limits a significant amount of CO₂ emitted and its impact on the environment. The current Da Nang facility has a production capacity of 1 million bottles per year offsetting 8.2 tons of CO₂ emissions.



Through the grant program, Evergreen Labs studied the potential of a new market expansion to upscale the Glassia potential in Vietnam through a social franchising model. As ICM Falk Foundation and Evergreen Labs understand the importance of understanding markets, the grant studied in-depth market insights including capturing consumer surveys, performing competitor analysis as well as initiating potential partnerships for expansion. As a result of this grant program, Glassia plans to open a second facility in Ho Chi Minh City in Q2 2022 with various private-sector partnerships.

Key takeaways from this multi-stakeholder approach include:

- A novel partnership focused on market-driven and localized solution development drive suitable and sustainable business creation
- Blended financing grants provide upstream entrepreneurs with the necessary initial capital to focus on market fit and scaling opportunities
- With modern and educational branding, Glassia triggers consumers to consider circularity and its impact on the environment
- Partnerships focused on scaling options for upstream solutions provide best practices for other innovators including collaborative financing options, social franchising, and licensing

RECOMMENDATIONS

The future of upstream innovation in Vietnam



The pressing need to design plastics out of our lives is apparent and upstream innovation provides the solutions needed to transform waste systems into circular ones.

Vietnam has faced immense challenges in managing downstream plastics and has transitioned towards a new era of designing waste out of systems completely. Through this research, an emerging ecosystem of innovators who are pioneering waste-free living including plastic replacements, new materials, and reuse models has been discovered. Of the identified solutions, material circulation dominates, consisting of substitution and composting models. Agro-waste material alternatives also stood out by leveraging the rich agriculture industry of Vietnam.

The limited number of reuse and refill models signifies the newness of these models with its potential operational challenges in the context of Vietnam such as logistics. Overall, the observable and growing upstream innovation landscape highlights the noticeable transition towards circularity that is being driven by innovators and entrepreneurs across the country.



Regardless of the many challenges facing entrepreneurs in the upstream sector, multiple opportunities for upstream innovators prevail including growing consumer markets, favorable policies coming into place, and an open market with few competitors.

As the market develops, the *successful entrepreneurs* will be those that focus on pushing the boundaries of their innovations to ensure that the *prices can compete with plastics or their products can offer more than their plastic counterparts*. Additionally, it may be wise to prioritize export markets until domestic demand increases as green premiums decrease.

To lift and guide these innovators has been a substantial feat, driven by a vast support network of intermediaries providing incubation, acceleration, and research. The emerging ecosystem has provided a foundation to permit the successful growth of these entrepreneurs. However, *early adopters need more curated, targeted support to reach their full potential*. Entrepreneur support organizations and programs must offer practical, tangible support backed by in-depth market insights to genuinely guide innovators. For full-rounded, comprehensive programming, *cross-border, multi-stakeholder approaches* can leverage a wider pool of expertise and offer entrepreneurs an integrated journey of layered support that helps build sustainable enterprises.



Lastly, funders must get more creative in deal funnel development and become more collaborative with other intermediaries in order to be successful in this developing sector.

There are not many players involved in this ecosystem yet, therefore opportunities remain available to become a leading force for upstream innovation investment in Vietnam. There are risks associated with being an early mover however, this spotlights the need for more blended financing and other flexible options available to deploy in order to mitigate risk. Offering patient capital for early movers through collaborative structures including grant programs will provide innovators with the launch pad they are seeking during early development stages.

In summary, there are endless opportunities for innovators in the upstream sector. Early adopters have plenty of room to play in this ecosystem and need curated support for piloting activities and practical commercialization opportunities.

Funders need to get creative with blended financing tools to motivate entrepreneurs and de-risk deals. *Collaboration amongst all stakeholders in this ecosystem is critical, especially paired with co-funding opportunities for early-stage innovators as demonstrated by local-centric organizations such as the ICM Falk Foundation;* resulting in the building of a foundation for larger funding organizations to access a flourishing pipeline of startups and partners. If all ecosystem players lean into the opportunities at hand within the upstream innovation sector in Vietnam, this sector could become a leading force for economic growth and sustainable impact for innovators within the region.

NOTES

- ¹ The process of waste incineration poses a significant threat to public health and the environment in the form of global warming, acidification, photochemical ozone or smog formation, eutrophication, and human and animal toxicity (Sharman et al., 2013).
- ² Accor group made a global commitment to phase out all guest-related single-use plastics in all hotels by end of 2022: <https://group.accor.com/en/Actualites/2020/01/zero-single-use-plastic-in-all-hotels>
- ³ Reverse logistics is defined as activities conducted after the sale of a product to recapture value and end the product's lifecycle, typically through the recollection of products for reuse.
- ⁴ Awards identified were typically found to discover and recognize good ideas but not utilized for further development of idea, innovation or solution.
- ⁵ Find out more information about this program [here](#).
- ⁶ Total number of funds in Vietnam is 180, with domestic investments less than 10 million USD, while foreign funds invested around 100 million USD during Q1 2021.
- ⁷ Do Ventures, 2020

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