World

WORLD
DATA COLLECTION SURVEY ON TA FACILITY FOR IMPACT INVESTMENT AND ECOSYSTEM DEVELOPMENT

PROGRESS REPORT

April 2021

Japan International Cooperation Agency (JICA)

Dream Incubator Inc

ED
JR
21-025

Chapter 1. Project overview

1-1 Background

Private sector-centered financial flows in the developing economies have overtaken ODA in volume since about 20 years ago. With the growing importance of the role of private finance and the $2.5 trillion annual financing gap to deliver the Sustainable Development Goals (SDGs), the mobilization and catalytic role of ODA has been a long-standing issue.

To optimize the limited source of funds and achieve the SDGs efficiently and effectively, innovations that apply cutting-edge science and technology are the Ace card. It is expected that the private sector will accelerate the achievement of the SDGs by promoting technological innovations and new business models through business activities. In developing countries, however, the business environment (including access to funds) is never ever favorable for entrepreneurs and early-stage startups looking to establish innovative, high-risk business models. Nevertheless, in recent years, private companies, and investors in and outside of Japan have been accelerating their expansion into developing countries with the aim of starting new businesses. Those companies and investors explore business models that help reach the SDGs on their own. Incorporating solutions to social issues into said business models through social impact investments, ESG investments, etc. is also part of the trend.

In such a circumstance, with the implementation of the “Information gathering and confirmation survey on support for African entrepreneurs” project, JICA has started to engage in fund establishment and management support aiming at startups in the seed and early stage in Africa where contractors are the general partners. In Asia, a support system for entrepreneurs, startups, and SMEs (collectively called “startups and others”) in collaboration with private foundations, funds, and international organizations that have track records in the field of social impact investment is being studied under the “Data collection survey on partnership for leading enterprises acceleration and financing (LEAF)” project. This project studies a scheme in which JICA and the governments of developing countries act as a catalyst for private funds to flow into social impact investments through technical support projects and grant aid programs and take the risks that private investors fear. During the process of studying the same scheme, 3 main issues become clear. Specifically, ① The realization of TA facilities to provide support for startups and others to establish or expand their business, ② The study of an efficient building method of a startup ecosystem, ③ The establishment of a method for objective measurement and evaluation of impact (non-monetary social and economic benefits generated by said businesses). In addition to these, many Japanese companies and research institutes own innovative technologies that can create significant social impact if used by startups and others in their businesses. If a system is

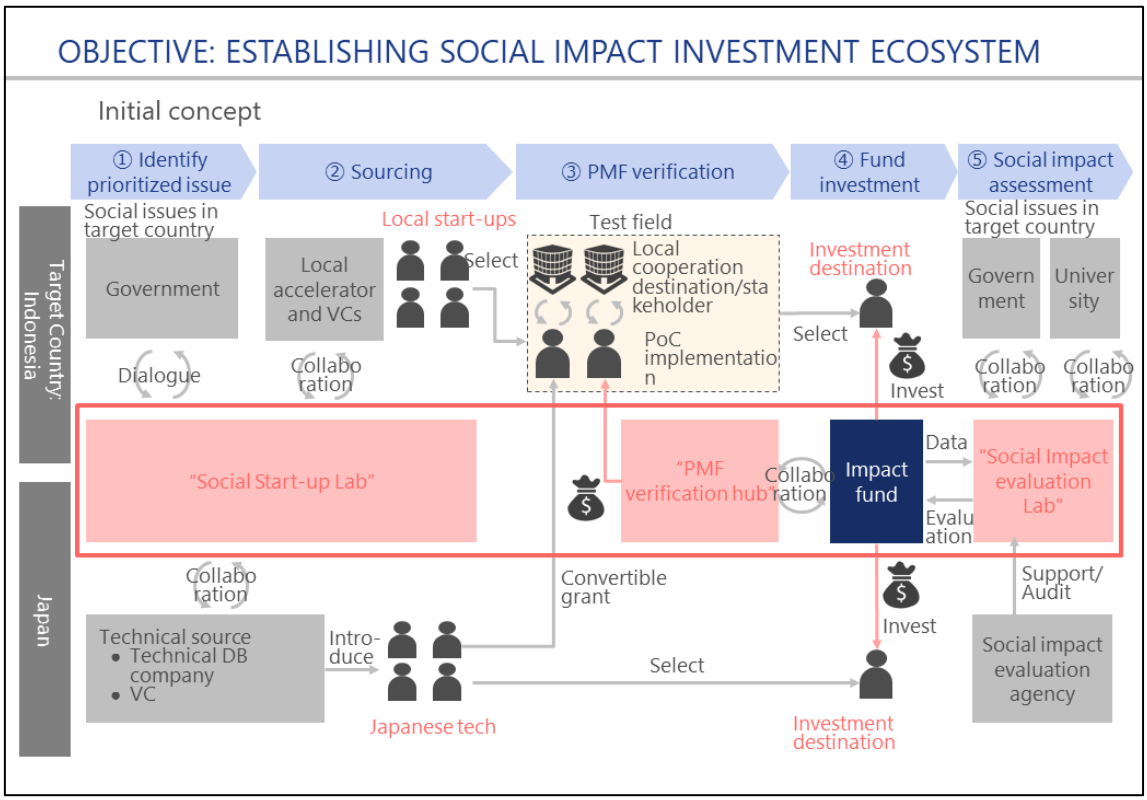
established to match these technologies effectively and efficiently with startups and others in developing countries, it will help Japanese companies with their expansion overseas, contribute to the application of Japanese technology and generate social impact in developing countries.

As the coronavirus pandemic goes global, the presence of entrepreneurs who set up businesses with new technologies or outside-the-box ideas in areas of healthcare, public health, and agriculture (especially food and nutrition related fields) will help build a more resilient society that can mitigate the negative impact or become less susceptible to the pandemic.

This project empirically studies specific methods to address increasingly apparent issues through the "Data collection survey on partnership for leading enterprises acceleration and financing (LEAF)" project, matches Japanese technologies with startups and others in the developing world, build an ecosystem, and contributes to the realization of effective TA facilities that support JICA's framework of social impact investment funds (through TA projects and grant aid programs) and the ecosystem building.

1-2 Research purpose

This research project covers India, Vietnam, and Indonesia (countries with different ecosystem development stages). In the world after coronavirus, new businesses that employ new technologies or outside-the-box approach is much more significant than ever before. The purpose of this project is to study in details how TA facilities under different ecosystems should be, the roles and functions public-sector agencies can play, and ecosystem building methods by matching innovative technologies (including those held by Japanese companies) with startups and others in developing countries in the areas of healthcare, public health, and agriculture (food products, nutrition, etc.) where there is much room for applying Japanese technologies (including attempts to adopt digital technologies in these areas to solve problems), providing support for the formulation of business development plans for local startups and implementation support for proof of concepts.



【Figure 1-2-1: Targeted ecosystem (proposal)】

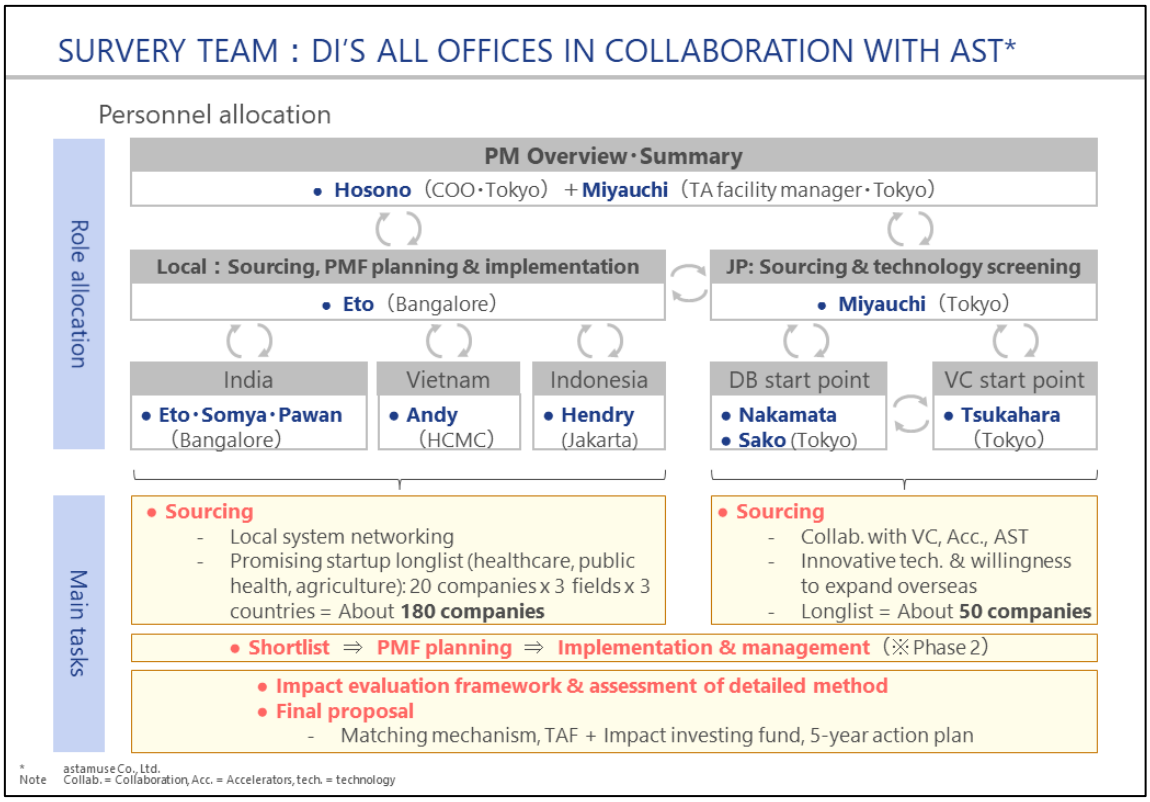
1-3 Research coverage

India, Vietnam, and Indonesia, 3 countries with a certain size of middle-class population, are chosen as the target regions of this project based on market size and population size, which are the premises of social impact investment fund establishment. In India, the building of startup ecosystem varies greatly by region. Since Telangana has been implementing startup ecosystem building policies led by the state government, both phases of the project will include Telangana as the target region for research.

1-4 Project team organization

This project is delivered by Dream Incubator Inc. (DI). Our core business is focused on fund establishment / management and startup support / public-private partnership, building unique business models for solving social issues and producing new business by a high-level integration of strategy consulting and incubation (fund investment and startup investment in and outside of Japan). In the search for technology screening and business opportunities in a wide range of technical areas (including healthcare, public health), Astamuse with its database of 200 million

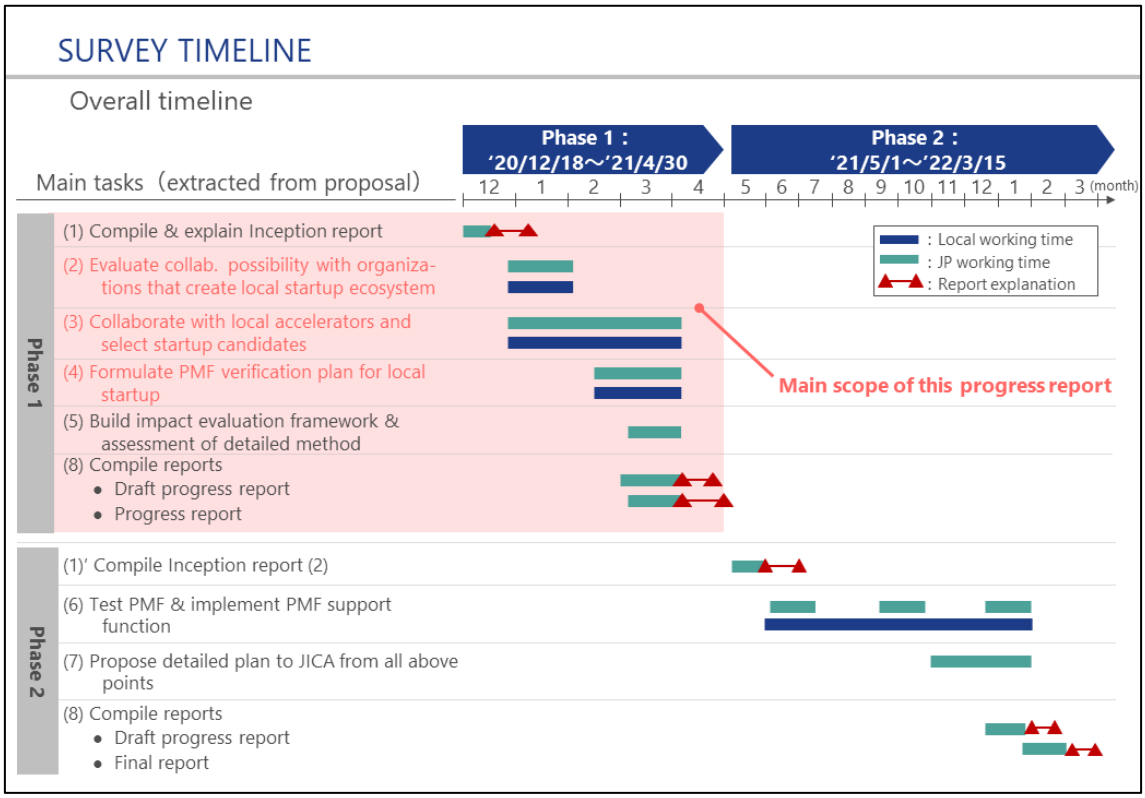
new technologies in 80 countries around the globe and the capabilities necessary to extract innovative technologies that can solve social issues has assigned their staff members to work closely with DI for the delivery of this project. Details of the project team organization are shown below.



【Figure 1-4-1: Project team structure】

1-5 Project timeline

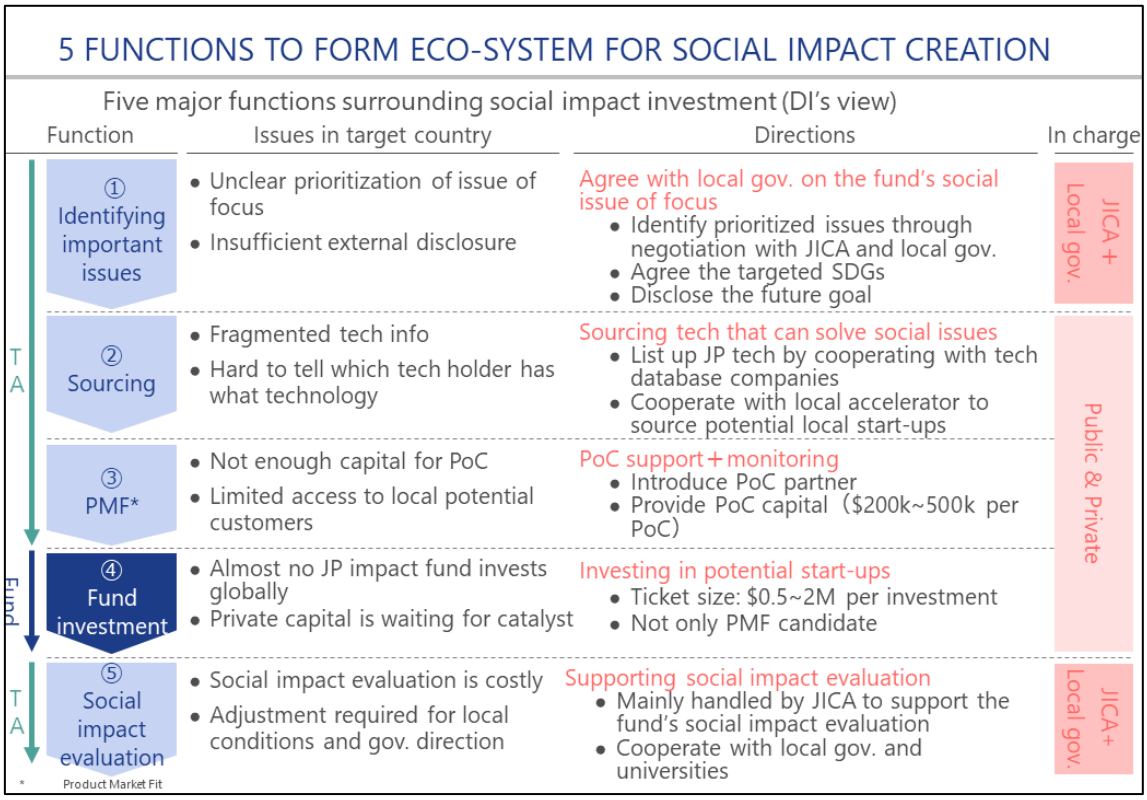
This project will take place in 2 major phases. Phase 1 is from November 2020 through April 2021. Phase 2 is from May 2021 through March 2022. The overall work breakdown structure is presented in the following figure.



【Figure 1-5-1: Project timeline】

1-6 Summary of study results

In the Phase 1 of this survey, DI made its best effort to concretize and propose an expected public-private partnership surrounding JICA, with specific focus on the 3 functions of ②, ③ and ⑤ among the 5 ones shown on the below figure which are indispensable to form eco-system to gather startups and innovative technologies.

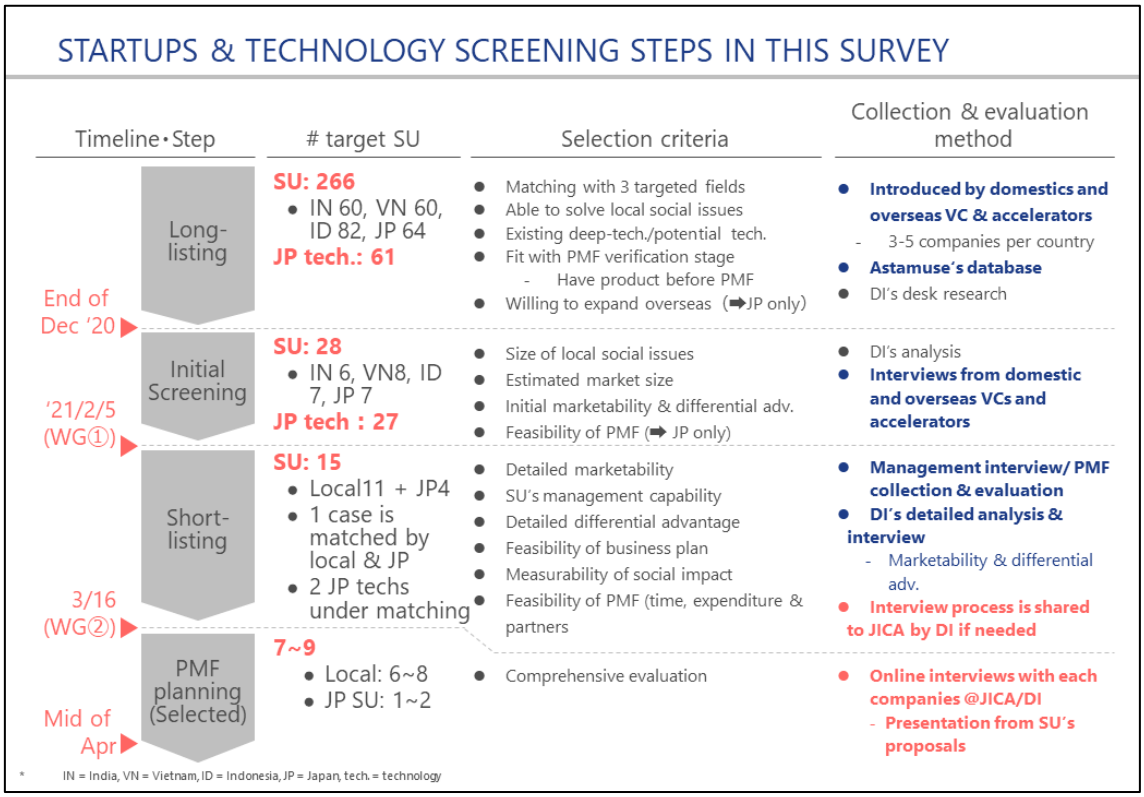


【Figure 1-6-1: 5 Functions to form eco-system for social impact creation】

The main progress and outcome throughout this Phase 1 are summarized as follows by the mentioned 3 functions.

② Sourcing

First, we identified and listed prioritized social issues in the target 3 countries and 3 fields i.e. healthcare, public health, and agriculture. Then, we implemented comprehensive and multi-layered screening for promising startups inside and outside Japan, and Japanese innovative technology holders. Throughout the process, we not only collaborated closely with various stakeholders within the related eco-system, such as venture capitalists and accelerators both in the targeted countries and Japan, but also utilized Astamuse's proprietary database of Japanese technologies and patents in thorough manner. At the same time, we've made the best effort to devise multi-dimensional evaluation criteria from both economic and social standpoint, in close collaboration with JICA. Finally, we've successfully short-listed 15 notable startups, aiming not only to extract practical insight from this trial sourcing and screening process for JICA, but also to select candidate startups for PMF verification support in the following Phase 2 of this survey.



【Figure 1-6-2: Start-ups & technology screening steps in this survey】

In addition to the above screening process, DI has implemented a matching trial both between local and Japanese startups, and between foreign startups and Japanese innovative technologies, to achieve the followings in this short time span.

- Joint PMF verification support based on a close tie-up between a Japanese with outstanding genome editing technology in aquaculture and a local startup running a marketplace of aquacultural products
- Initial analysis of applicability of Japanese technologies extracted by Astamuse into local startups in the aquacultural fields both in Vietnam and Indonesia

③ PMF verification support

DI and JICA co-organized a series of final selection interviews with each of the 15 short-listed startups. The interviews were held with attendance of JICA's personnel from Japan and targeted countries with multi-dimensional evaluation criteria which includes priority of the target social issue, difficulty level of the issue, estimated size of impact, marketability and competitive advantage, excellence of management team, and feasibility of PMF verification. In advance of the final selection interviews, DI's experienced strategy consultants supported those start-ups in drafting and organizing their PMF verification plans.

Through the above-mentioned process, DI and JICA made the best effort to optimize the selected startup portfolio based on its nationality, target market fields, PMF implementation country and synergy potential with JICA's ongoing initiatives. Currently, the finalization of this selection and concretization of PMF verification plan is underway by DI team.

⑤ Social impact evaluation

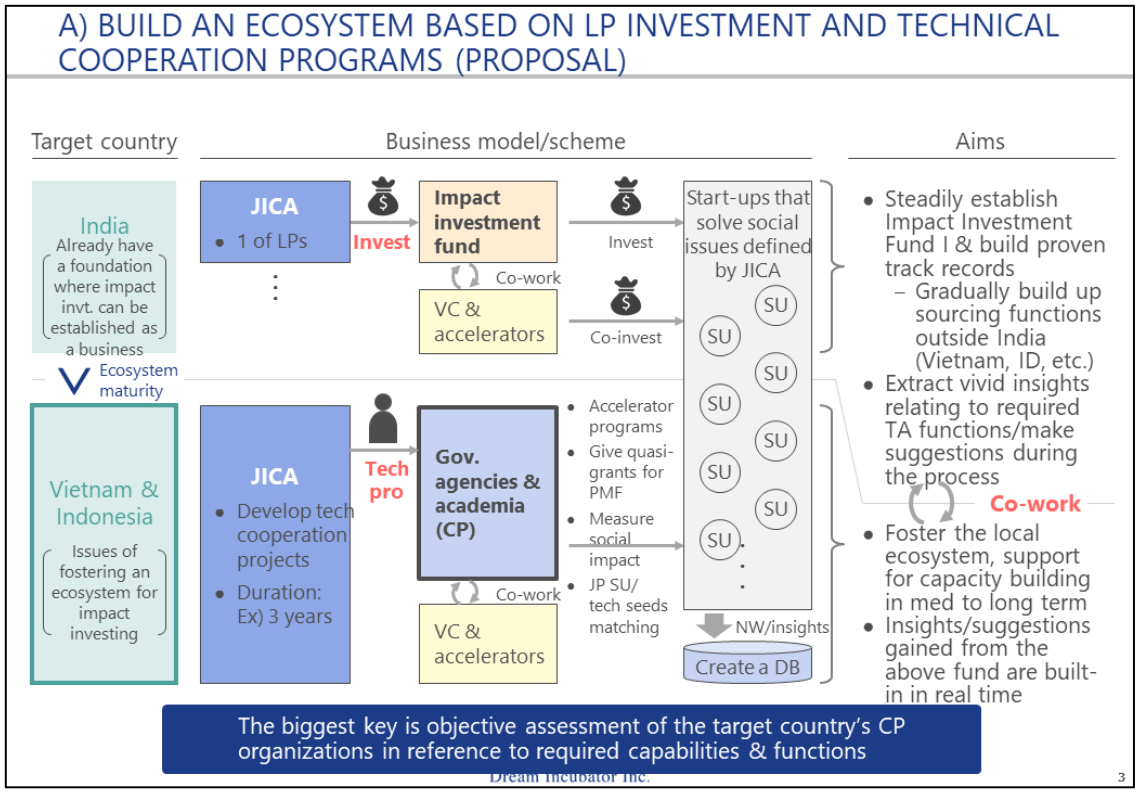
To identify the most suitable social impact evaluation metrics in this survey, we conducted overall comparison analysis across widely used standardized metrics such as SDGs, IRIS and HIPSO within global social impact investment community. Eventually, we've proposed to JICA to apply customized IRIS into PMF verification projects planned by the selected startups in the Phase 2 of this survey, with a view of past application track records and ease of usage by social impact investment funds, after our several discussions with key personnel of GIIN (Global Impact Investing Network). Since our hands-on based support is indispensable for the startups to apply IRIS, in a series of process including ①selecting indicators, ②deciding data frequency, ③devising data collection scheme and ④analyzing and reporting, we will carefully customize and apply it by obtaining support and advice from the GIIN personnel in the Phase 2 of this survey.

In parallel with all the above trial process regarding the 3 functions of ②, ③ and ⑤, DI proposed the following 3 directions to JICA in its consideration of expected role and approach inside social impact investment eco-system.

A) Eco-system building in combination of LP investment and TA program

JICA's utilizable tools and methodology differ by maturity level of startup ecosystem in the 3 target countries. For example, in India where the ecosystem reached a certain level of maturity, JICA could materialize its catalytic role by joining a social impact investment fund as LP (Limited Partner) and mobilizing private investment. Then, JICA can get widely exposed to startups who practically addresses social issues and surrounding eco-system and accumulate its network and expertise in social impact investment context. On the other hand, in Vietnam and Indonesia where the startup ecosystem remains more unmatured than India, it's an option for JICA to create TA project(s) to nurture local startup ecosystems and enhance capacity of local counterpart(s). The counterpart can be local prospective university or public organization leading startup innovation, aiming to demonstrate accelerator program, PMF grant aid scheme, social impact evaluation, matching with Japanese innovative technologies and startups. For this purpose, the most essential KSF (Key Success Factor) is to identify, select and engage a counterpart capable of playing a centripetal role in the local ecosystem of promising startups,

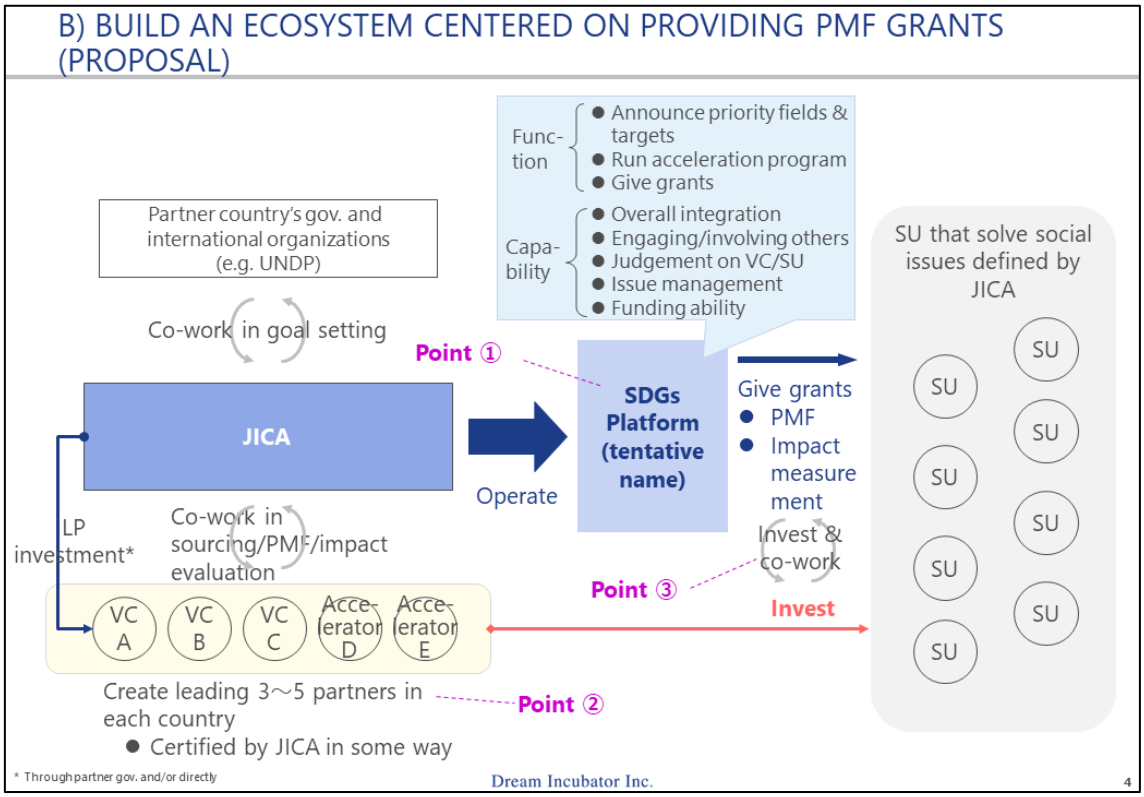
venture capitals and accelerators. This direction is summarized in the below figure.



【Figure 1-6-3: Ecosystem based on LP investment and Technical cooperation programs】

B) Eco-system building based on PMF grant aid scheme

The next possible approach is to provide PMF grant aid with startups as JICA's core support tool. While the PMF verification support trial is underway throughout the Phase 1 and 2 of this survey, we've firmly confirmed a great need for this scheme among startups, which potentially enables JICA to be deeply engaged in the eco-system building process for rather small budget scale. For instance, the below figure visualizes an image for JICA to proactively form and manage SDGs platform, fund promising startups addressing social issues jointly with local decent accelerators and VCs, and measure those social impact brough about from this ecosystem. To concretize this direction, it's crucial for JICA to 1) establish a dedicated taskforce for this mission, and 2) devise cash-based grant aid scheme for startups.



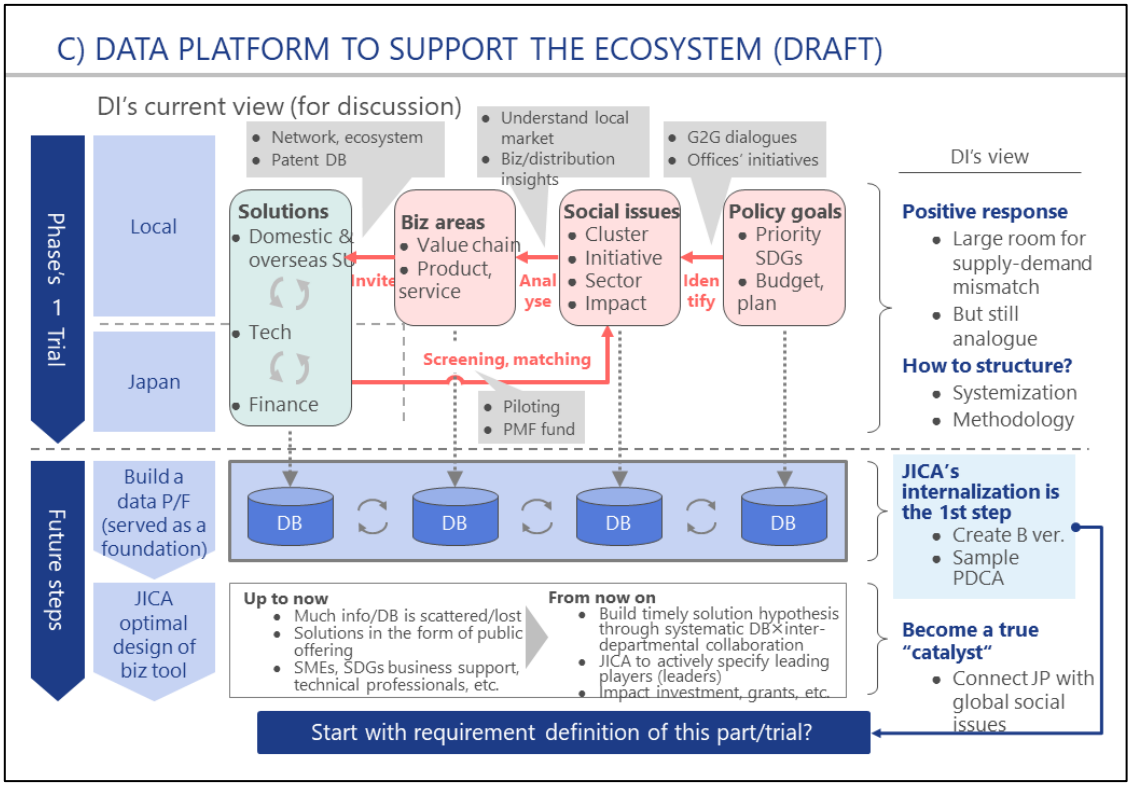
【Figure 1-6-4: Ecosystem centered on providing PMF grants】

C) Development of information infrastructure as foundation for eco-system building

Final proposal made from a different viewpoint is to design information infrastructure which enables JICA to match prioritized social issues in developing countries and suitable solutions such as local and Japanese startups and innovative technologies. After our human-powered trial matching process in this Phase 1 of survey, we have confirmed solid matching-ability between those issues and solutions. Thus, we strongly believe it meaningful for JICA to systemize and digitalize this learnt expertise and methodology, aiming to consolidate it as JICA's own catalytic service operation tool in the medium to long term.

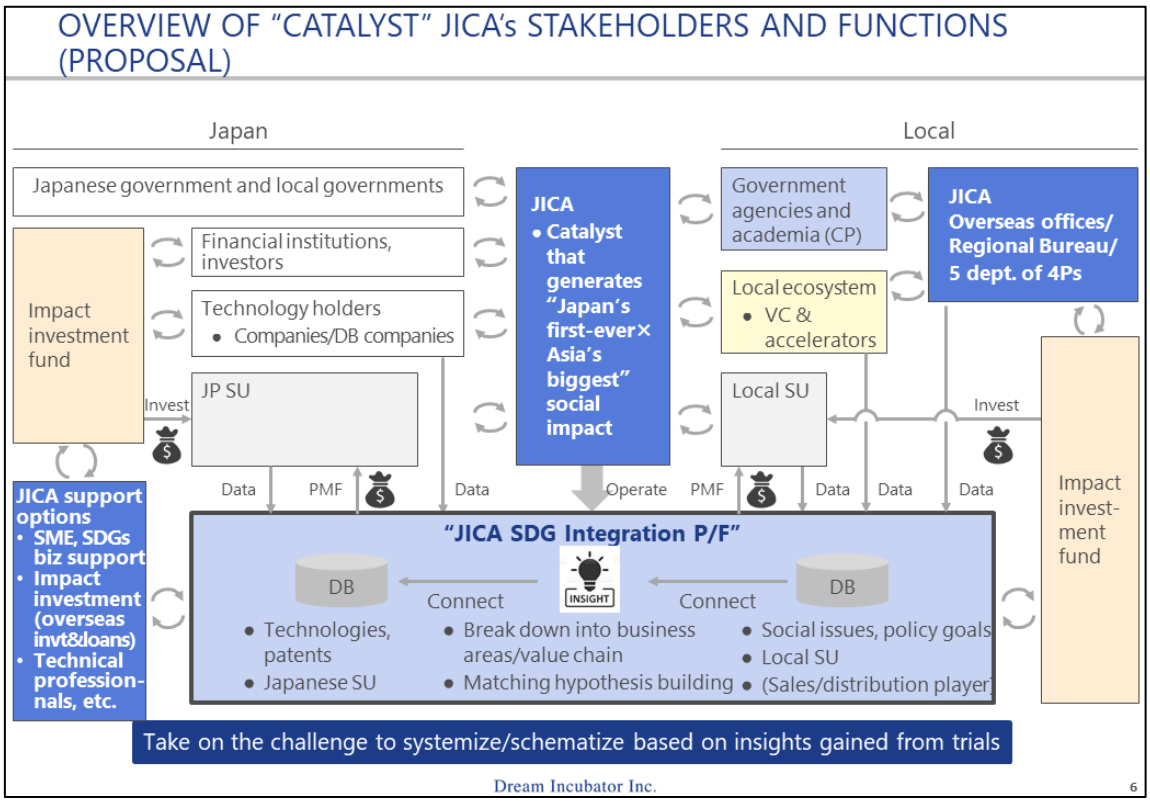
As exemplified in the below figure, JICA's overseas representative offices and related departments jointly update and compile database about local policy objective and prioritized social issues in a systematic and structural manner first. Then, the information infrastructure is equipped with sophisticated logic and algorithm to convert the database into business domains, which gets connected with an external database of solution which compiles related information about startups, Japanese innovative technologies and investors in an organic and synchronized manner. Finally, JICA devises practical mechanism to screen the solutions and match them with local social issues in a periodic and constant manner. Based on those process, JICA can have a useful chance not only to integrate its own but fragmented information across various offices

and departments, but also to develop its optimal service operation tool timely and flexibly. We think it insightful for JICA to develop a beta version and test a PDCA cycle at small scale in JICA to validate the effectiveness and feasibility of this information structure development.



【Figure 1-6-5: Data platform to support the ecosystem (draft)】

Based on all the above 3 proposed directions, the below figure summarizes an entire architecture of necessary stakeholders and functions for JICA to concretize its catalytic role to play in social impact investment related activities.



【Figure 1-6-6: Overview of catalyst JICA's stakeholders and functions】

Although all the proposals in this chapter are still at an initial stage, we'll endeavor to concretize an optimal image of future TA facility and JICA's expected role to play based on our continuous PMF verification support in the Phase 2 and discussion with all the related departments and personnel of JICA.

Chapter 2. Organizations and collaboration candidates that make up the startup ecosystem of each country

2-1 Overview of major players in ecosystem in each country

In considering cooperation in each country's ecosystem, the main players are classified into governments, universities, technology database companies, accelerators, VCs, impact funds, foundations, and social impact evaluation organizations from the perspective of "social impact & startup". Based on the list, we have summarized the outline of each player. In this survey, we interviewed some of those players, exchanged opinions on the possibility of collaboration with your organization, and received recommendations about PMF candidate companies.

Vietnam is in the process of forming an ecosystem of startups, with a limited number of accelerators, VCs with many small players, and very limited impact investors (see table below for details).

【Chart 2-1-1: Major Players in Vietnam】

Type	Name	# of Investees in Vietnam	AUM($M)	Notable Portfolio or Accelarator program alumni
Accelarator	Vietnam Silicon Valley	60	7	Lozi(lastmile delivery platform for food, FMCG) Ship60 (Lastmile delivery)
	VIISA	30	6	WeFit (Lifestyle membership one-for-all) Base.vn (VN Enterprise platform)
VCs	500 startup	75	14	ELSA (AI English learning APP) Bizzi (accounting automation) Coolmate (Male fashion subscription)
	FPT Ventures	24	n.a.	Sendo (Ecommerce platform) ANTS (Ads brokerage platform) CricketOne (alternative protein from cricket)
	CyberAgent capital	15	100	Tiki (Ecommerce platform) Foody (food delivery platform) VeXeRe (bus ticket online booking)
	Vina capital Ventures	10	100	Logivan (B2B/B2C Platform for truck) GoStream (Video-tech for livestreaming) HomeBase (fintech for realestate buying)
	Do Ventures	3	50	F99 (Platform for fresh premium foods) Palexy (Camera AI for operation optimization of physical store)
	Dragon capital	3	3	
	Mekong capital	5+	420	NhatTin(B2B last-mile logistics) F88 (Alternative collateral lending for small amount) Pharmacity (Pharmacy chain)
Impact Investors	Patamar capital	5	69	Canal Circal (Micro Finance fintech) Trust Circle (Peer-2-peer saving & lending) TOPICA (Online Education)

Source: Company websites, online articles
*AUM:Asset Under Management

On the other hand, Indonesia has a more developed startup ecosystem than Vietnam, has many accelerators, and has many VCs and impact investors (see the table below for major players). Due to stable economic development and expansion of the middle class, the number of smartphone users is increasing, and startups are emerging mainly in the EC and mobility space such as ride sharing fields. As of the end of March 2021, six unicorns have been produced from Indonesia.

【Chart 2-1-2: Major Players in Indonesia】

Type	Name	# of Investees in Indonesia	AUM($M)	Notable Portfolio or Accelarator program alumni
Accelarator	Plug and play	1	NA	Sayurbox (perishable ecommerce) Crowde (agritech financing) Halofina (personal finance)
	ANGIN	NA	NA	KitaBisa (crowdfunding for charity) Kargo (trucking marketplace) Taralite (p2p lending)
	Indigo	>100	NA	Payfazz (payment fintech) PrivyID (e-identity) Sonar (analytics)
	Digitaraya	NA	NA	Qlue (smart city solution) Halosis (AI chatbot) Bobobox (hotel tech enabled)
	Next Dev Academy	NA	NA	Crowde (agritech financing) Squline (language edutech) Habibi Garden (IoT agri)
	Grab Velocity	NA	NA	TaniHub (agritech b2b ecommerce and financing) Qoala (insurtech) Workmate (digital manpower)
VCs	East Ventures	122	447	Tokopedia (unicorn ecommerce) Traveloka (unicorn OTA) RuangGuru (education tech)
	Alpha JWC	22	173	Kopi Kenangan (F&B tech) Kredivo (paylater fintech) Carro (auto marketplace)
	SMDV (Sinarmas)	17	450	Waresix (ondemand logistic) Aruna (fishery marketplace) HappyFresh (grocery ecommerce)
	Kejora Ventures	21	240	SiCepat (last mile delivery) Investree (P2P fintech) Kredivo (paylater fintech)
	MDI Ventures	43	790	Payfazz (payment fintech) Kredivo (paylater fintech) Alodokter (telemedicine)
Impact Investors	Patamar capital	5	68	Mapan (social commerce) SayurBox (perishable ecommerce) DanaCita (education loan fintech)
	Gayo Capital	4	10	Inacom (agritech) Wlabku (waste recycling) Daur (waste management)

Source: Company websites, online articles

*AUM:Asset Under Management

India's startup ecosystem has outperformed Vietnam and Indonesia in terms of funding size, number of start-ups, quantity and quality of investors, and number of unicorns. The table below lists representative players with a proven track record among the many Accelerators, VCs, and impact investors.

【Chart 2-1-3: Major Players in India】

Type	Name	# of Investees in India	AUM($M)	Notable Portfolio or Accelarator program alumni
Accelarateor	Axilor Venture	50	30	SigTuple (AI based healthcare diagnostic solution) PocketAces (Digital Content Creation) Advantage Club (SaaS)
	Venture Catalysts	142	133	BharatPe (Payment Solutions) Rentomojo (Online Rental Platform) Pepperfry (online furniture marketplace)
	YCombinator	96	700	Cashfree (Payment Processing) Raxorpay (Payment Processing) Khatabook (Digital Accounting)
	Karnataka Startup Cell	328	NA	Wicked Ride (Online Bike Rental) Fyle (AI-based expense management) AgNext (monitoring and improving agricultural food quality)
	T-Hub	134	NA	MyGate (SaaS-driven visitor management) Whistle Drive(Employee Transportation) Detect Technologies (pipeline integrity monitoring)
VCs	Accel	161	5,314	Myntra (fashion ecommerce) Flipkart (e-commerce) Vedantu (Edutech)
	Chiratae	84	900	Myntra (fashion ecommerce) Cure.fit (Fitness Training) Firstcry (online retail for newborn)
	Blume Venture	165	203	Unacademy (Edutech) Zomato (online food ordering & delivery) Purplle (personcal care marketplace)
	3one4 Capital	56	187	Licious (Online meat & seafood delivery) Open (NeoBank) LoanTap (Online Consumer Loan Platform)
Impact Investors	Aavishkaar	30	498	Arohan (Micro loans) Equitas (Microcredit) Suryoday (Small Finance Bank)
	Omidyar	78	879	Vedantu (Edutech) 1MG (online Pharmacy) Northern Arc (NBFC)
	MSDF	34	NA	Arohan (Micro loans) Ujjivan (Microfinance Bank) Jana Small Finance Bank (Microfinance Bank)

Source: VCCedge (for AUM), Traxn (for # of investees in India, Portfolio company details)
*AUM:Asset Under Management

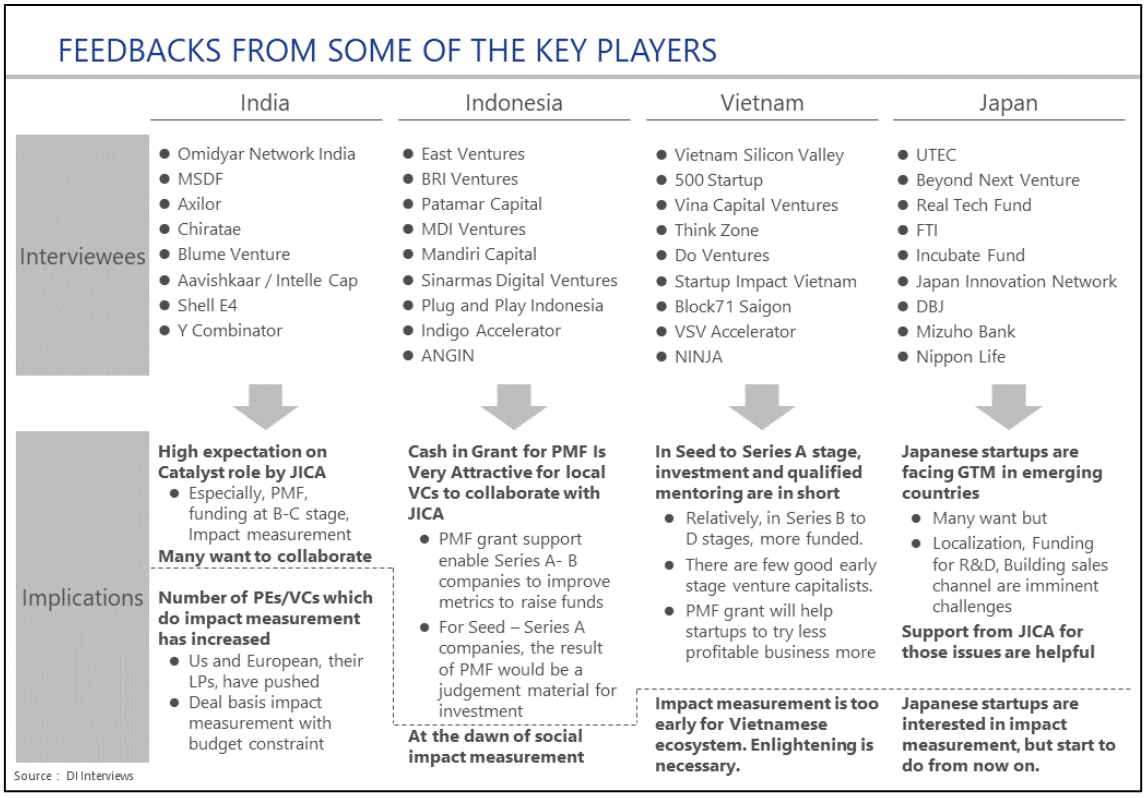
2-2 Possibility of collaboration for building an ecosystem with JICA

To identify the possibility of collaboration with local players of your organization, we exchanged opinions through interviews with the major players of each country mentioned in the previous section (see the figure below).

Ecosystem players from Vietnam, Indonesia, and India have high expectations for JICA's role as a catalyst in further deepening the ecosystem of each country. There were strong expectations for involvement in support to PMF of early stage companies, financing from seed to

series C, and impact evaluation. In Vietnam, where the formation of an ecosystem is relatively developing, there are very few accelerators and VCs that can provide high-quality mentoring to early stage companies, so there are expectations for JICA's involvement in solving this problem. In terms of impact evaluation, even in India, which is the most advanced, the measurement of impact evaluation has only begun in part, there were great expectations for JICA's contribution to the standardization, establishment and dissemination of impact evaluation with the involvement of the local governments.

On the other hand, regarding Japanese startups, although many companies wish to expand into emerging countries, many companies have problems with localization, funding for R&D, compliance with local regulations, and acquisition of local customers. There were many requests for expansion of JICA support in those regards.



【Figure 2-2-1: Feedback from potential partners in each country】

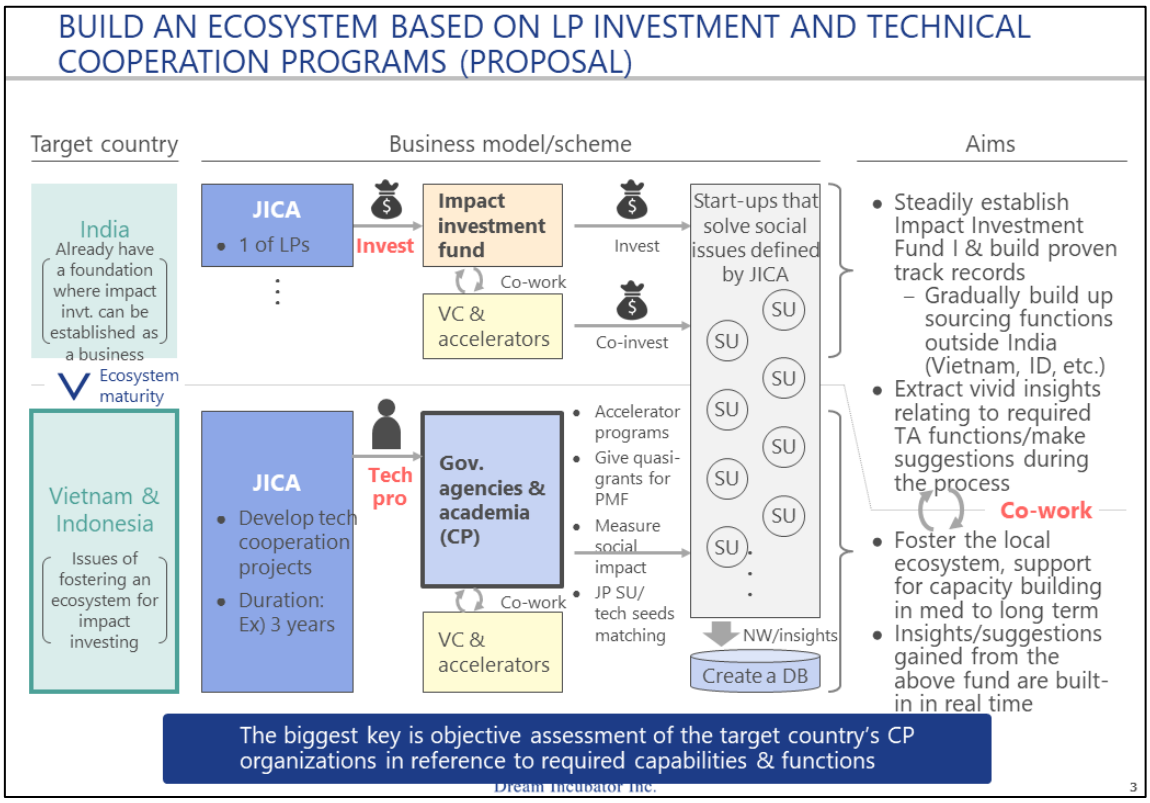
Now, unlike international organizations such as IFC, ADB, and IADB, your organization does not have a single department whose mission is to support startups and form an ecosystem independently. However, it is considered possible to meet the expectations from the above-mentioned local ecosystem by aligning ODA support facilities owned by each department across JICA.

2-3 Possible direction of consideration

To realize the above-mentioned possibility of collaboration, there are three major possible directions for consideration. Direction (1) and (2) are based on existing ODA support facilities and can be tackled immediately, and direction (3) needs to be created as a new facility and will be realized in the medium to long term.

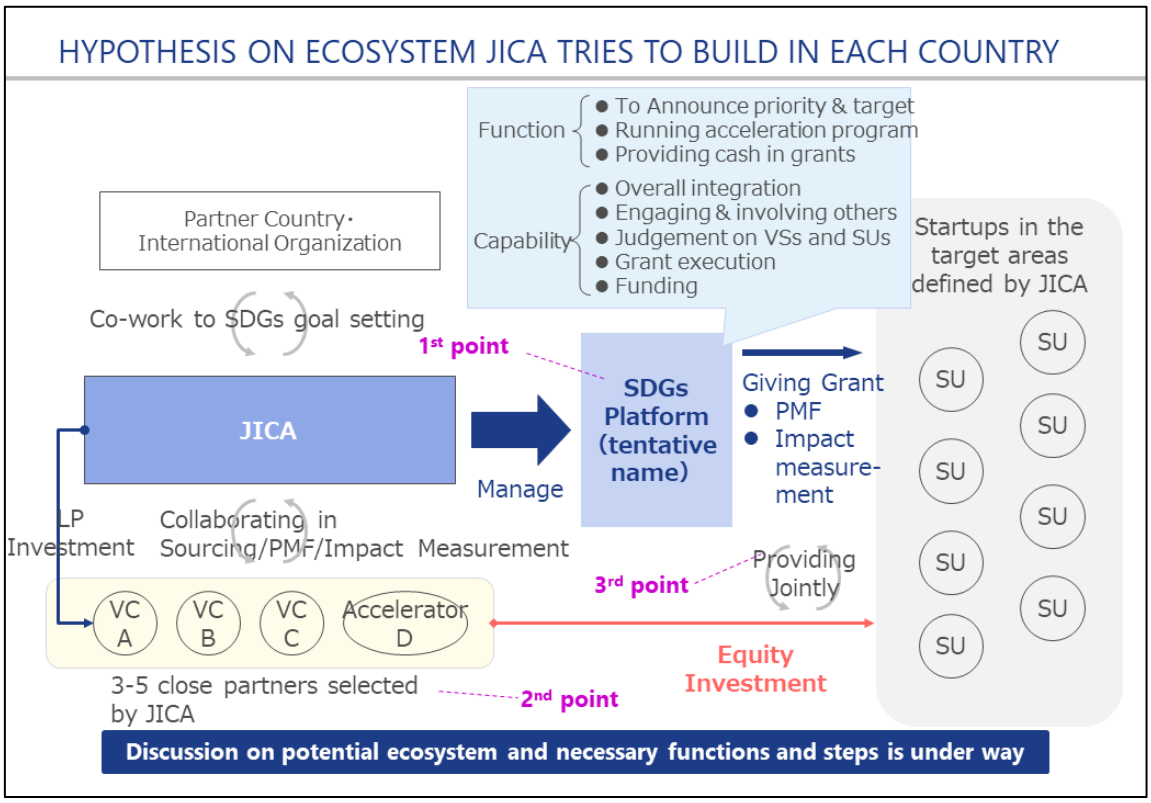
Direction (1) is LP investment in a social impact investment fund. We will embody the function of a catalyst by attracting private funds by using LP investment in any fund of your organization as a priming water. Through fund LP investment, we will increase opportunities for contact with startups and local ecosystem players who are working on solving social issues and accumulate networks and knowledge.

Direction (2) is to foster a local ecosystem and build capacity by utilizing technical professionals. With promising local universities and public innovation institutions as counterparts (CP), we will work on demonstrations such as acceleration programs, pseudo-grant for PMF, social impact assessment, and Japanese technology seeds matching. In this case, the selection of a CP to be a partner becomes the most important KSF (Key Success Factor), and in each country, identify and involve organizations that have strong ties with influential VCs and accelerators that have the attraction of high-quality startups.



[Figure2-3-1: Ecosystem formation based on the TA program]

Direction (3) is PMF support based on grant. From this survey, we found that the needs for local support are very strong, and it is possible for JICA to be directly involved in the formation of the ecosystem with a relatively low budget scale by using PMF grant. For example, as shown in the figure below, JICA will form and operate the SDGs platform by itself and will provide grant funding to startups working on solving social issues in collaboration with leading local accelerators and VCs. The combination of Grant by JICA and equity investment from them will result in stronger monitoring, better value-up, and effective impact measurement. In order to put this matter into practice, it is necessary to (1) form an independent unit which focuses on this mission with independent decision making authority and necessary budget within JICA and (2) realize cash in grant which enable grant money directly to go promising startups.

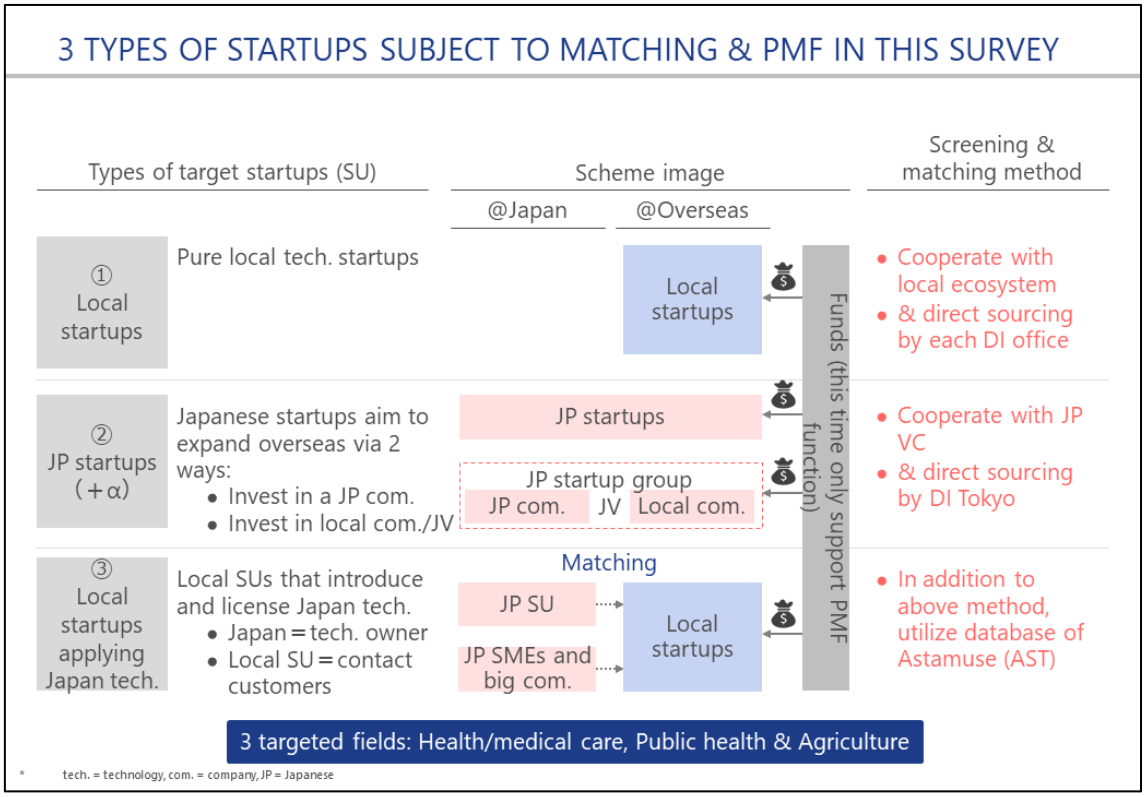


【Figure2-3-2: Image of ecosystem formation via PMF grants】

Chapter 3. Startup and technology screening and matching trials

3-1 Overall screening policy

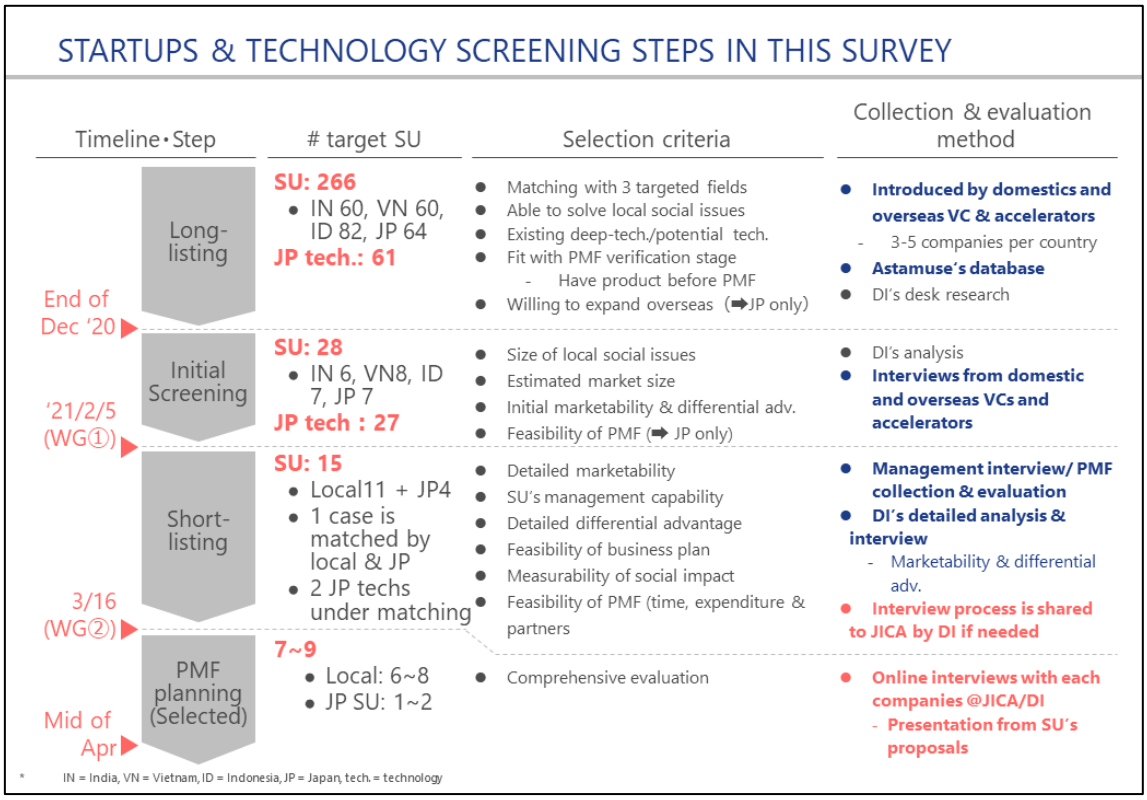
In this survey, there are three types of starts for this matching trials. The first is local startups in the three target countries (Vietnam, Indonesia, India). The second is Japanese startups which aim to expand its business in the three target countries. The third is startups in the three target countries that want to utilize Japanese technology. See the figure below for details.



【Figure 3-1-1: Startups subject to matching / PMF in this survey】

To ensure the fairness, competitiveness, and transparency of procurement, this screening will take about 5 months (2020 Dec to 2021 Apr) with the participation of JICA in four major steps to select PMF study recipients.

In the first stage, we list a total of 327 local startups and Japanese technology owners who develop businesses based on technology that contributes to solving social issues from the three areas of public health, agriculture, and healthcare.

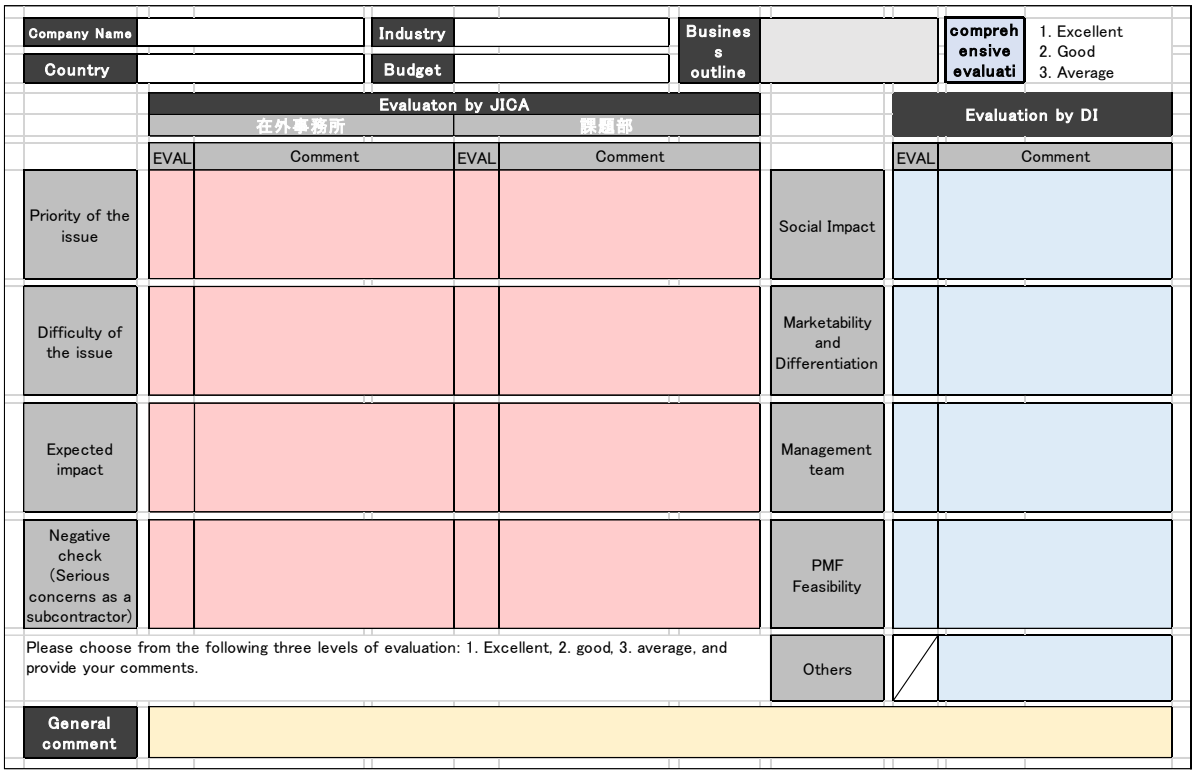


【Figure 3-1-2: Overview of the PMF candidate company selection process】

In the second stage, initial screening is conducted based on the size of social issues, the size of the total addressable market, quick analysis on marketability and differentiation factor, and the feasibility of implementing PMF (this viewpoint is only for Japanese companies). We narrow down to 55 companies. Detailed process is shown in the next section "3-2 Screening and selection of local startups".

In the third stage, we further narrowed down to 15 companies in consideration of factors such as detailed marketability, management team quality, detailed differentiation factors, feasibility of business plans, possible measurable impact, and feasibility of PMF.

In the fourth stage, to ensure the fairness, competitiveness, and transparency of the selection, we sent invitation emails to the startup company we interviewed, to explain the purpose and process the selection. Individual interviews were conducted, and scoring was carried out based on the following evaluation sheet between JICA and DI.



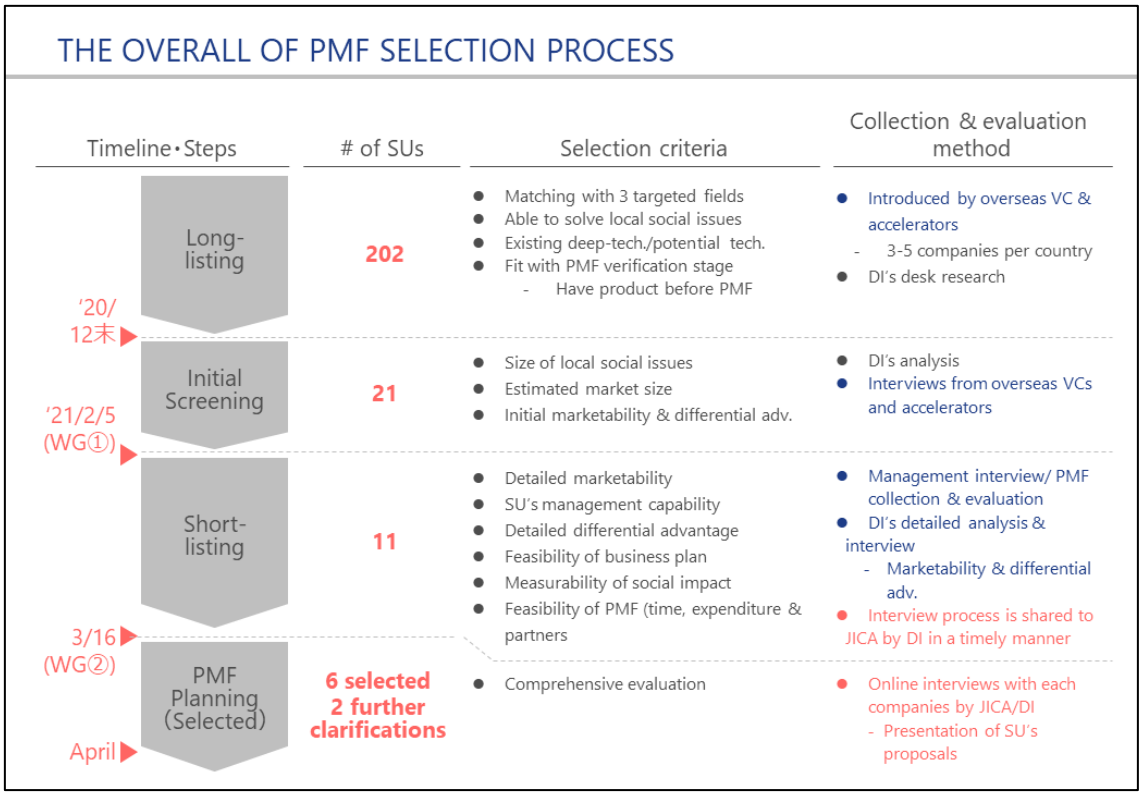
【Figure 3-1-3: Evaluation sheet format】

As a result, 6 companies were selected, and 2 companies need more clarifications to be selected. For the semi-selected two companies, we will additionally confirm the contents and budget of the PMF, and further narrow down with JICA with consideration on how JICA allocates the limited budget. Although not a priority, two companies have also received some recognition as candidates for PMF verification, and this will continue to be considered based on coordination with the overall budget. Tentatively speaking, we were able to select promising companies in a well-balanced manner in terms of country and field. In addition, Company X was selected as a matching example between a Japanese startup and a local startup, where it was unclear whether there would be companies worthy of selection at the start of the survey. Also, in India, one healthcare startup was selected from Hyderabad, Telangana state and one public health startup was selected from Pune, Maharashtra state while JICA has supported both states.

3-2 Screening and selection of local startups

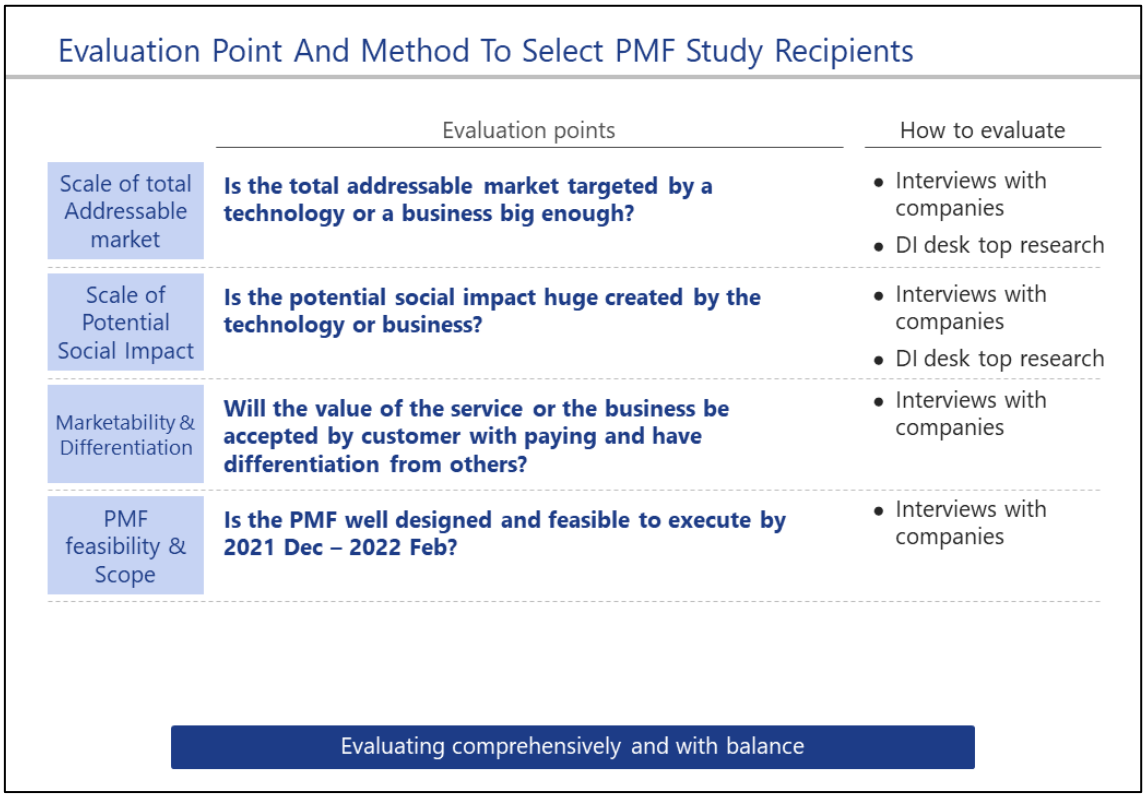
Based on the overall screening policy, we have narrowed down the local startups.202 companies were first listed on the long list, but in addition to the 6 selected companies, after

further clarifications on the 2 semi selected were made, and a total of 6-8 companies are expected to be selected as PMF survey recipients.



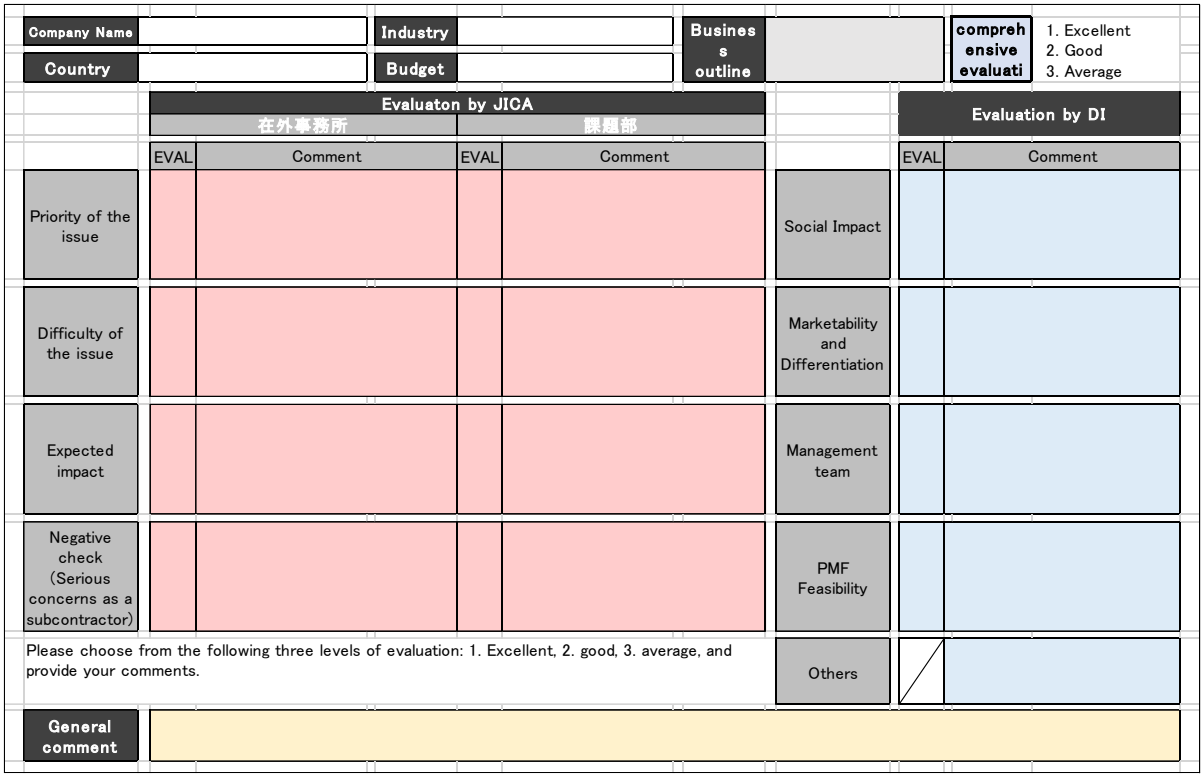
【Figure 3-2-1: Overview of the PMF candidate company selection process】

In the process of narrowing down from 21 initial screening companies to 11 short list companies, as shown in the table below, quick evaluation was carried out in terms of four aspects (the size of the market (from the perspective of Total Addressable Market), the size of social impact, marketability / discrimination, and the feasibility of PMF.) with three grade evaluation.



【Figure 3-2-2: Four aspects for the quick evaluation】

After that, 11 short-list companies, JICA and DI jointly interviewed, and based on the following evaluation sheet, and selected the startups.

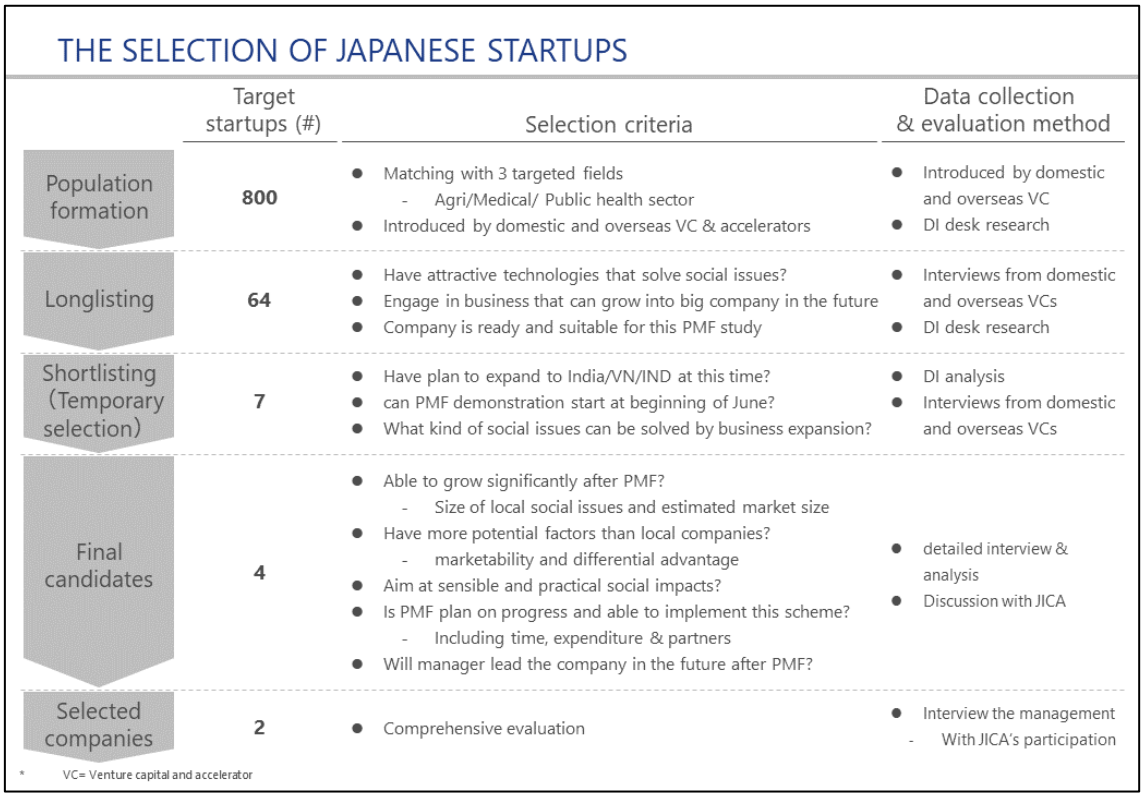


【Figure 3-2-6: Evaluation sheet format】

6 companies are selected on a definitive basis at the time of writing this report. By country where PMF is implemented, there are 2 startups in Vietnam, one in Indonesia, and three in India. By field, there were 3 healthcare startups, 2 agricultural startups, and 1 public health startups.

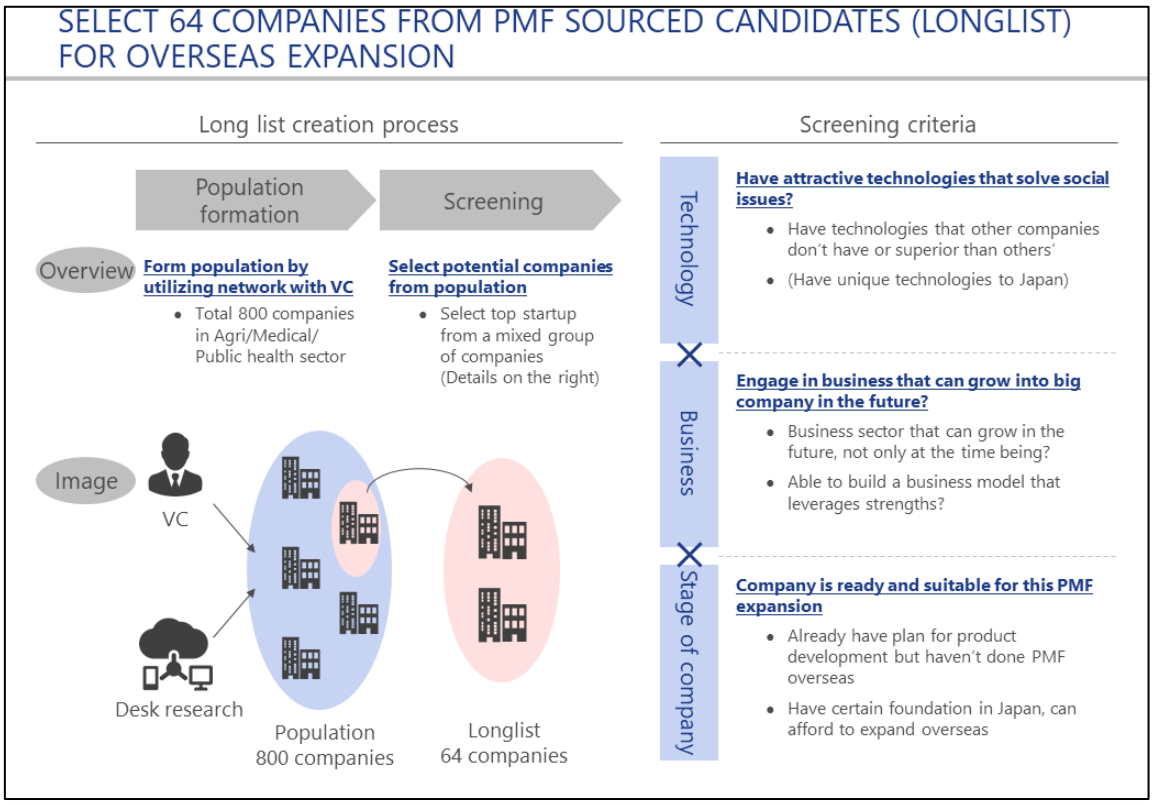
3-3 Screening and selection of Japanese startup

The selection of Japanese startups was conducted in five stages, and 2 companies were finally selected. The following figure shows the selection criteria and evaluation method for each stage.



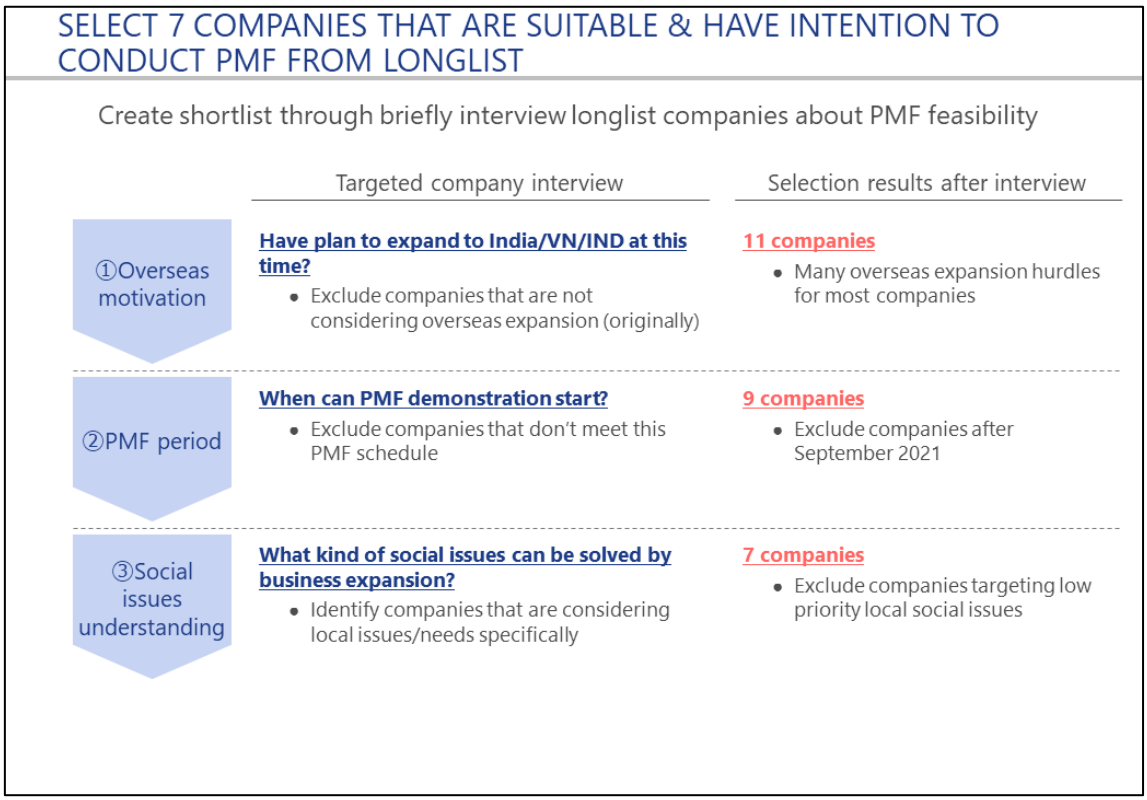
【Figure 3-3-1: Overview of screening policies and processes for Japanese startups】

In population formation and creating the long list, we interviewed domestic and overseas venture capitals and accelerators to select promising companies working in the three social issue areas. Aiming to create social impact, we selected companies that were likely to have PMF support needs while focusing on the technological and business aspects.



【Figure 3-3-2: Population formation and long list creation】

A short list was created by selecting companies with high feasibility of verifying PMF overseas.



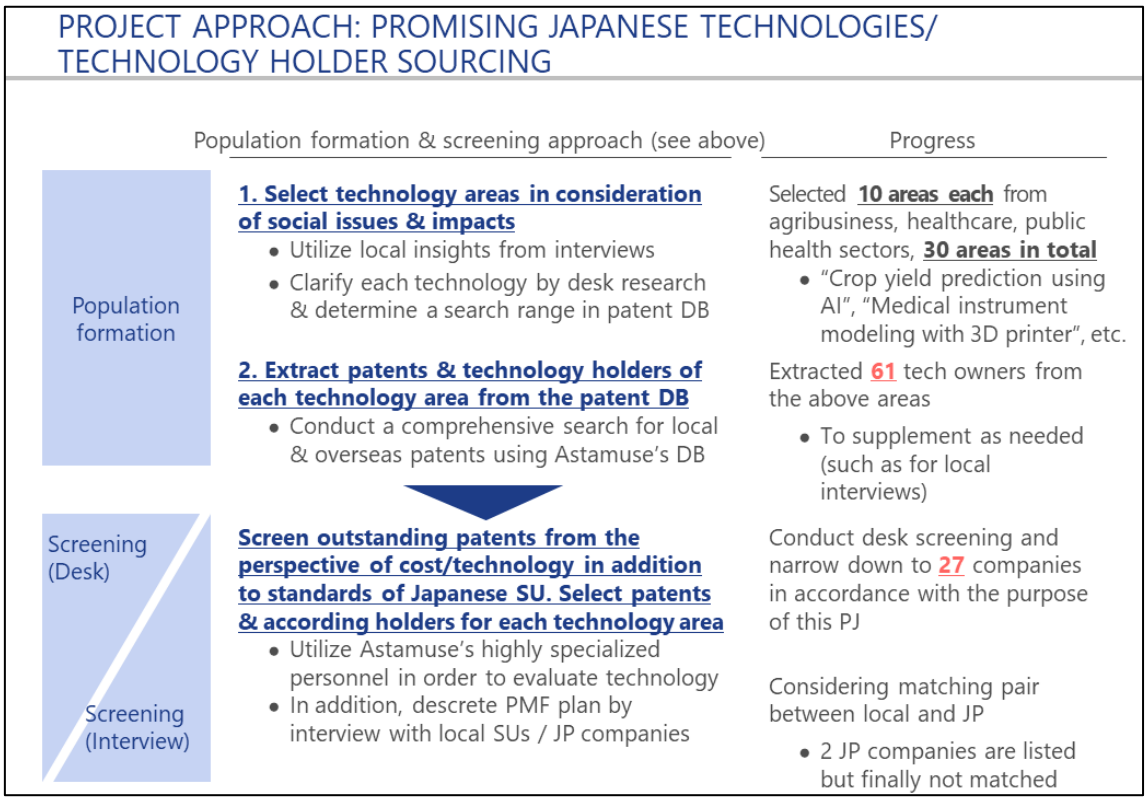
【Figure 3-3-3: Process of creating Japanese startups shortlist】

The selection of companies from the short list was based on the five perspectives shown in the figure below. The quality of management was assessed through interviews with JICA and DI.

【Figure 3-3-4: Evaluation criteria for selecting finalists】

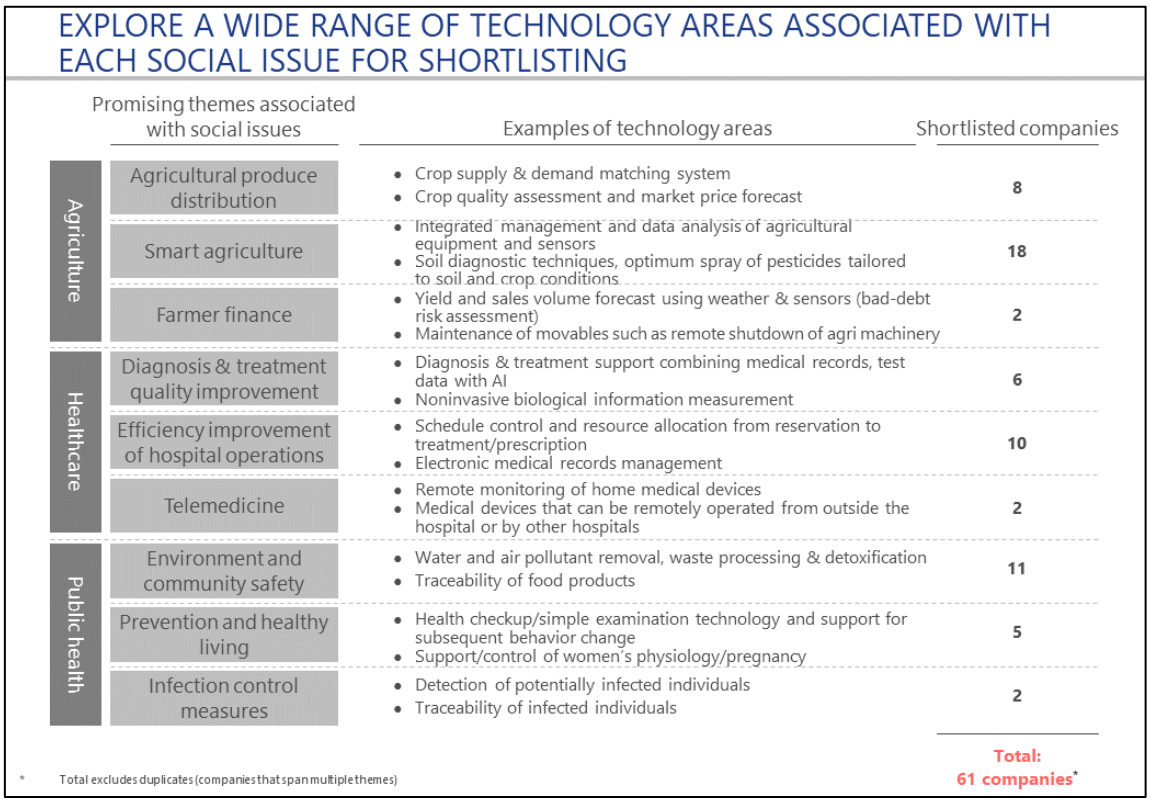
3-4 Screening and selection of Japanese technologies

The selection of Japanese technologies and technology holders is carried out in two major stages: "population formation" and "screening". See following figure for more details. Although the result shows no match due to tech issues, many promising technologies has been identified and the initiative has been met with positive feedback thus far during our meetings with local startups. The effectiveness of our approach has been recognized to a certain extent. By further fine-tuning this method for the project, we may have a valuable method for future studies.



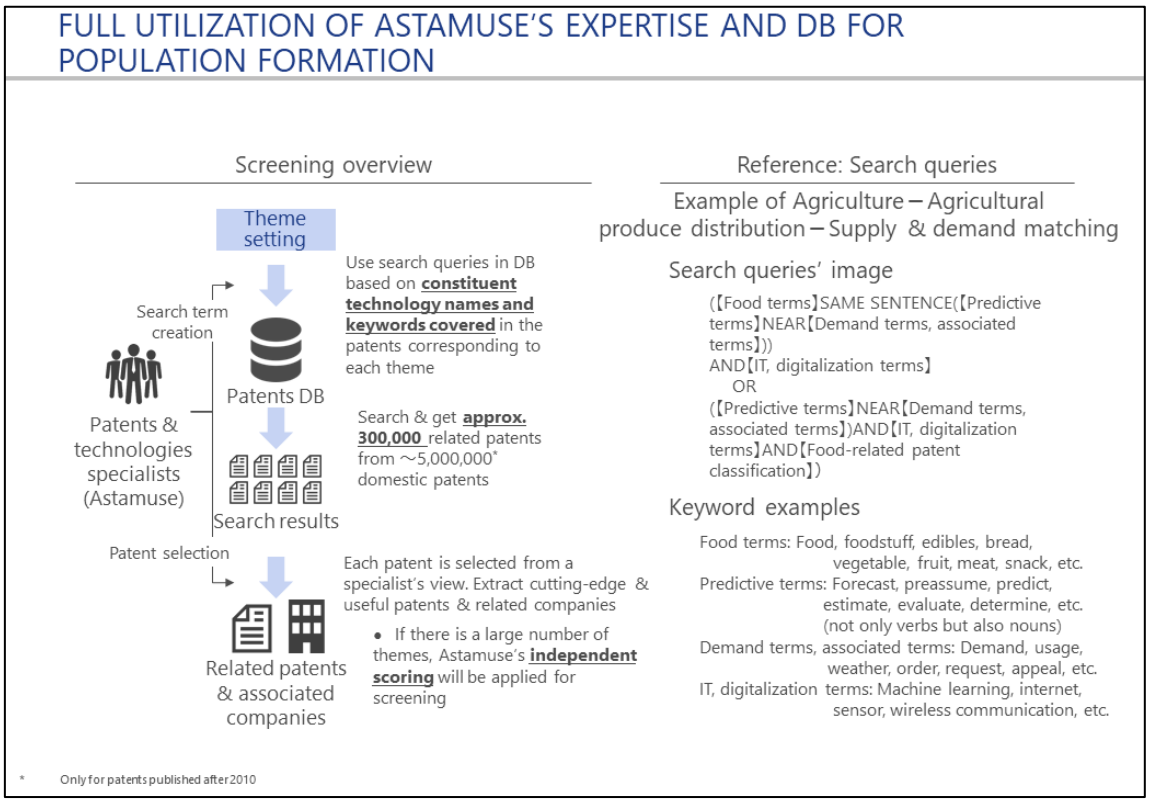
【Figure 3-4-1: Overall image of the screening and selection process of Japanese technologies】

First, we will start with population formation in the above process. Related areas of technology are selected from "agriculture", "healthcare", and "public health" (3 themes covered by the project). A patent search is then carried out on these areas. As a result, we have a group of 61 candidates from the initial selection process. The areas of technology and candidates selected are shown in following figure.



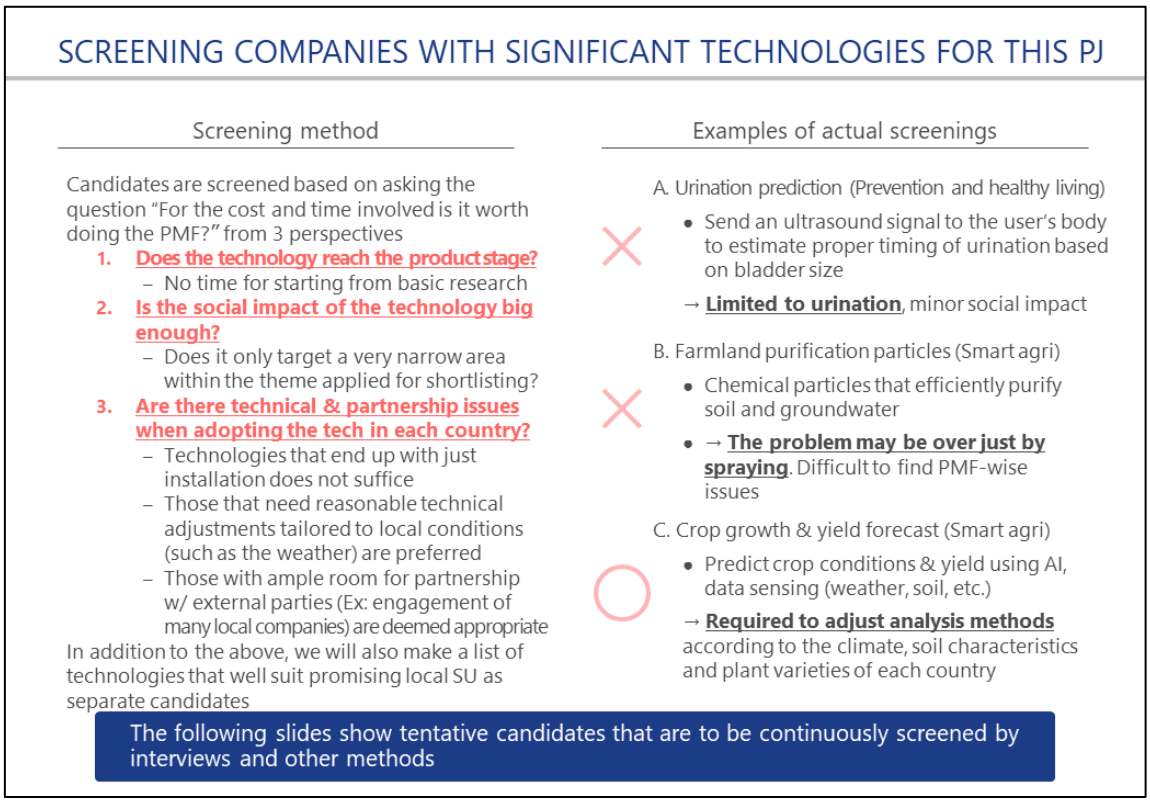
【Figure 3-4-2: Areas of technology and the number of selected candidates from the technology screening process】

In the patent search, each and every patent is evaluated and assessed from expert's view in cooperation with Astamuse. The detailed process is shown in following figure.



【Figure 3-4-3: Japanese technology patent search process】

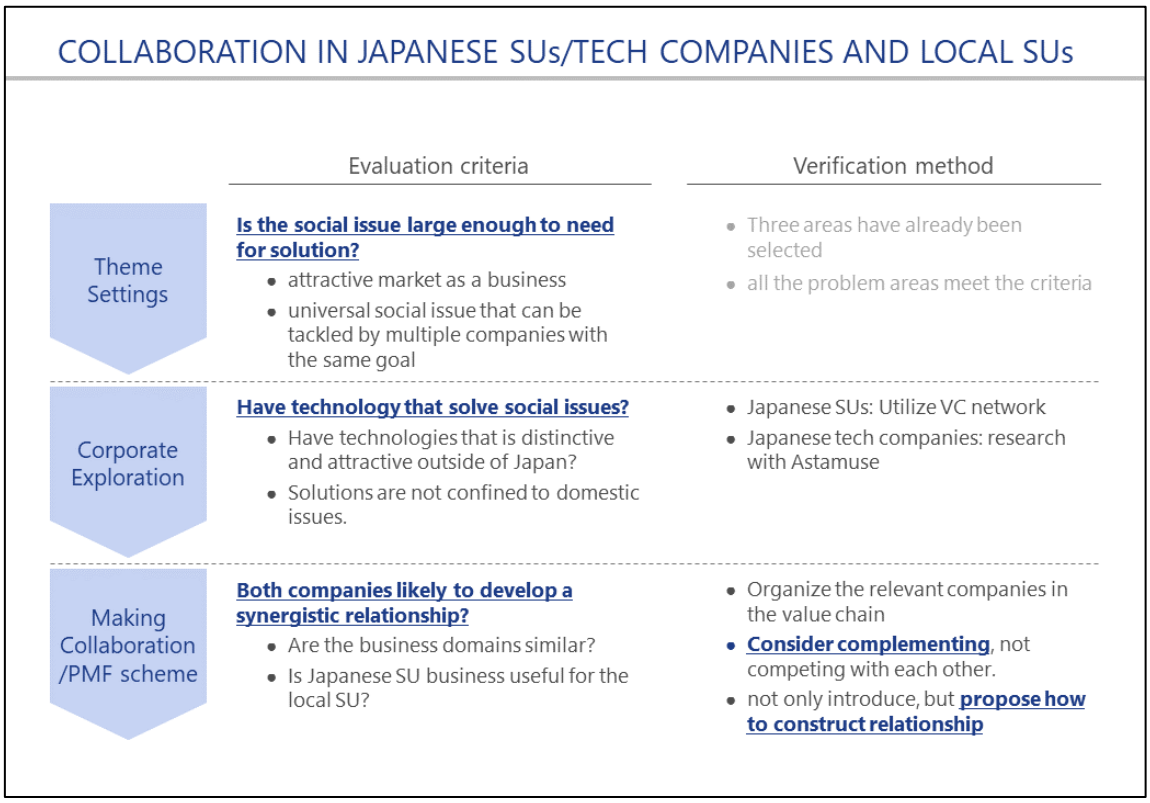
The initial screening is carried out on 61 companies based on established criteria such as technology stage and potential social impact. See following figure for more details. 27 technologies and technology holders are selected from this process.



【Figure 3-4-4: Initial screening process of Japanese technologies】

3-5 Trial Matching with Japanese startups and local startups

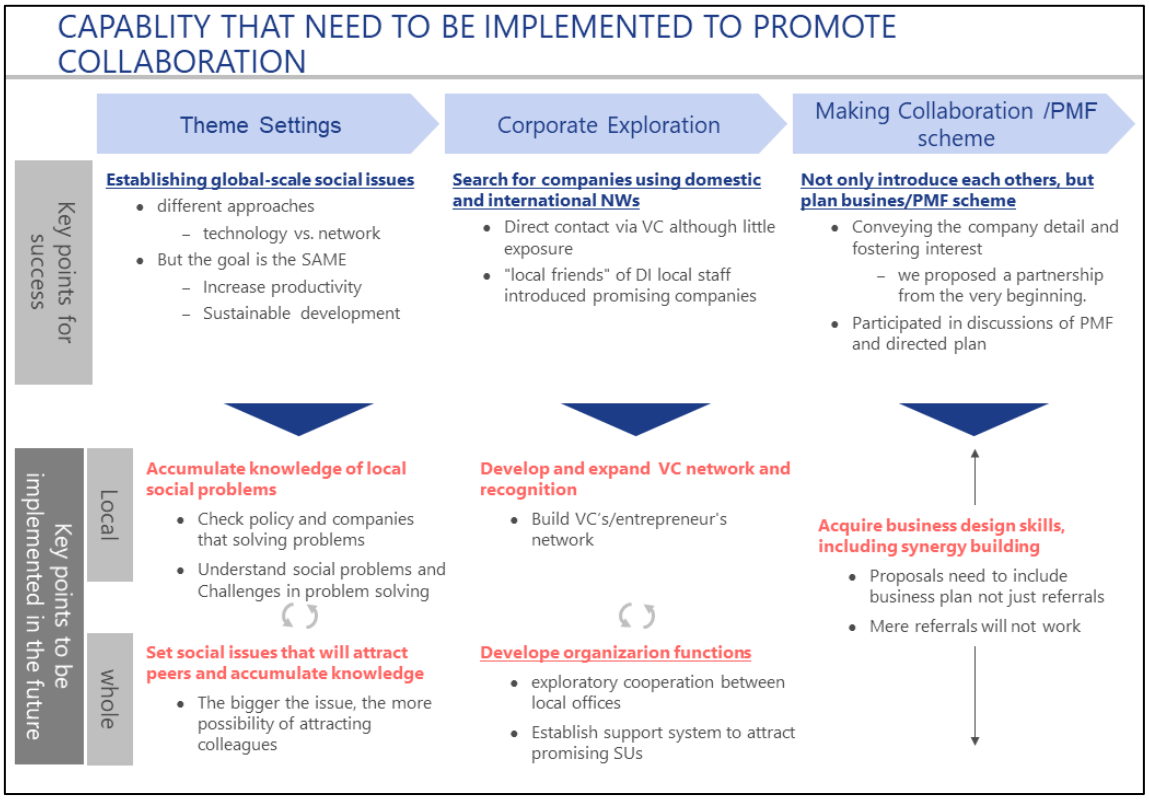
In matching Japanese startups with local startups, we examined the situation from three perspectives, as shown below. Since social issue areas in this case were determined in advance to be "agriculture," "medical," and "public health," emphasis was placed on corporate exploration and developing PMF projects. For the search of start-ups and companies with promising technologies, we utilized the network of professionals who usually conduct evaluations and surveys of technologies and companies, such as venture capitals, accelerators and Astamuse. Identifying promising companies through interviews with them contributed to the selection of companies in a short period of time. Since it was assumed that the introduction of companies alone would not lead to fostering mutual interest and collaboration, DI made collaboration plan that included a scheme of business or PMF. We also proposed a business model and participated in discussions to build relationship to promote the realization of matching in a short period of time.



【Figure 3-5-1: Perspectives and methods for matching Japanese startups and overseas startups】

Through the above discussion, the collaboration between Company X and Company Y in Indonesia was identified as a possible candidate for collaboration between Japanese and overseas startups in the PMF verification of this project. In concrete, we have established a relationship to conduct market research and product development by sharing the roles of each company, taking advantage of each other's strengths.

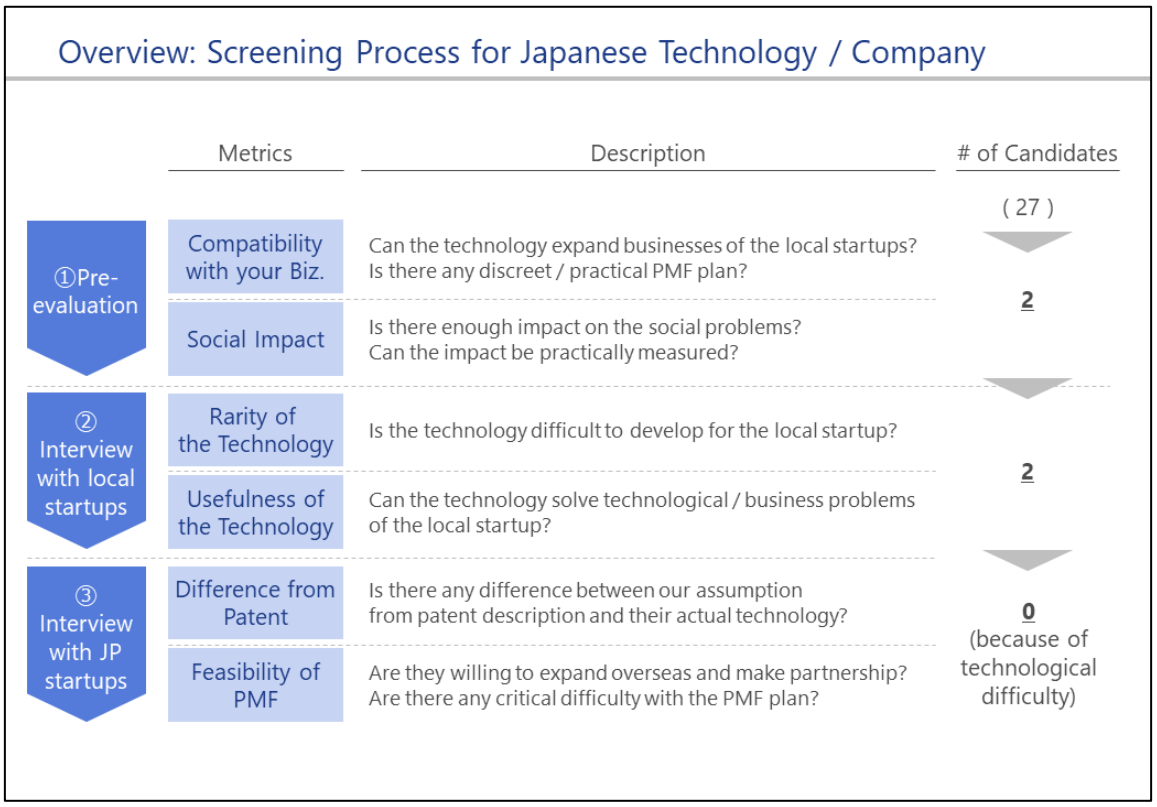
Based on the above process of finding candidates, to increase the number of matches in the future, it is important for JICA to not only accumulate knowledge about social issues but also to build a network of players around the startup and acquire business design skills to realize the matches.



【Figure 3-5-2: Elements to be acquired to realize a matching system】

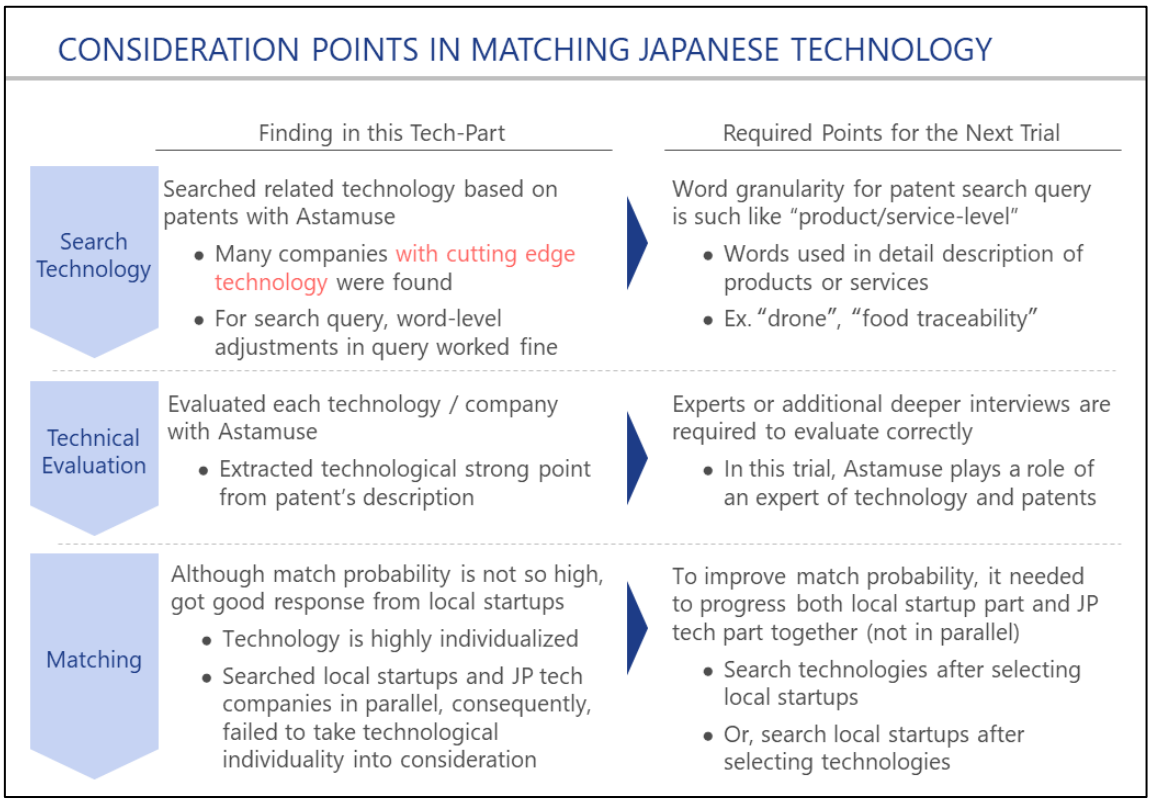
3-6 Japanese technologies and local startup matching trials

The detailed screening of 27 candidates selected in section 3-4 is undertaken in three steps to match with potential local startup as described in following figure. Two main evaluation criteria are set forth for each step. Interviews with local startup and Japanese technology holders have also been conducted with a total of 6 evaluation criteria applied individually. Results show none of the candidates (none selected) is ideally suitable, yet we have received positive feedback from the local startup throughout our ongoing discussions. The effectiveness of our approach has been recognized to a certain extent.



【Figure 3-6-1: Detailed screening of Japanese technologies】

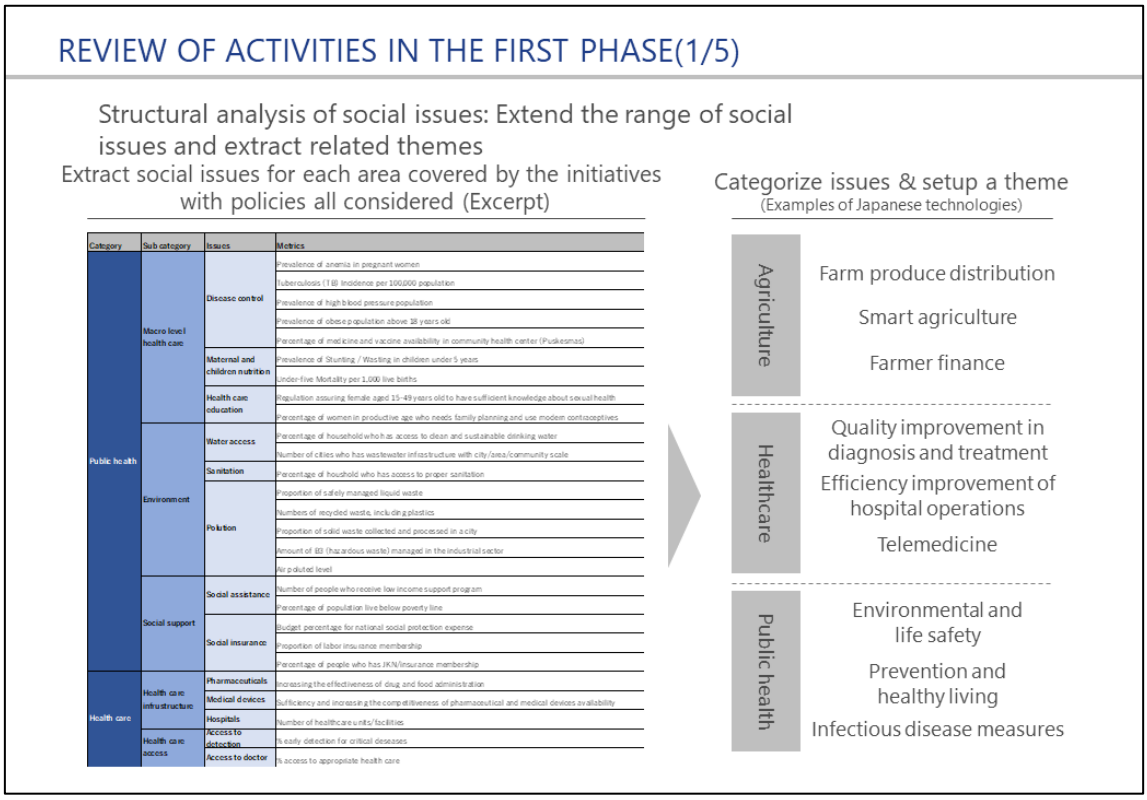
We select 2 Japanese technology holders from the first step above. To advance to the next step, a concrete PMF plan is drafted for these 2 companies. Interviews with local startup and the 2 companies have been conducted accordingly. The feasibility for applications in the local market is there for both companies to some extent, however, no candidate makes it to the finalist stage due to tech issues and the motivation/willingness of selected candidates. However, this trial has been met with positive feedback after several ongoing discussions with stakeholders. By further fine-tuning our approach and method based on what we have learned from this trial, gained insights will definitely contribute to the goals the project aims to pursue. Continuous improvements will be made based on the accumulated know-how and areas for improvement. See Figure 3-6-2 below.



【Figure 3-6-2: What we learned from this matching trial / Areas of improvement】

3-7 Initial proposal for matching systemization

To further deepen and expand the process sequence undertaken in this initiative, matching systemization is also considered. Before we look at the systemization proposal, let's review each process carried out in Phase 1. In the first process, we have extracted social issues related to 3 given areas (agriculture, healthcare, public health) in consideration of the policies of each country. Taking a deeper dive into those issues and policies we have managed to identify specific themes behind (see below figure).

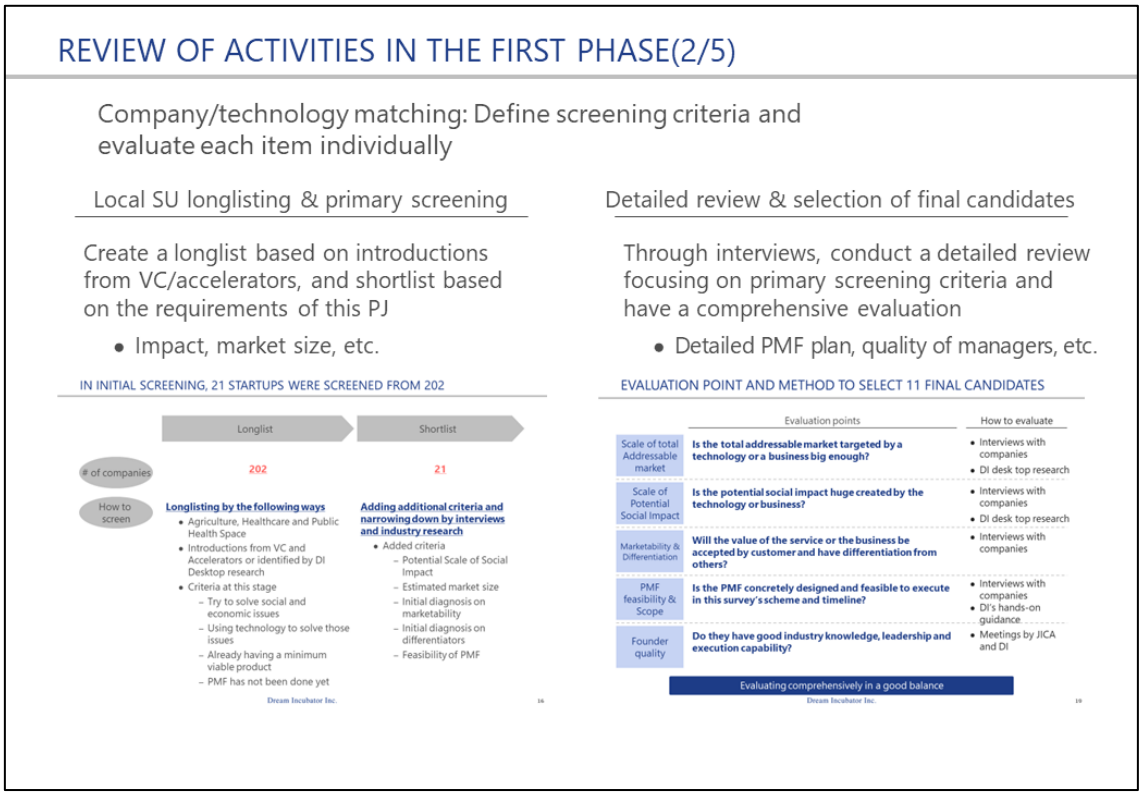


Category	Sub category	Issues	Metrics
Public health	Macro level health care	Disease control	Prevalence of anemia in pregnant women
			Tuberculosis (TB) incidence per 100,000 population
			Prevalence of high blood pressure population
			Prevalence of obese population above 18 years old
			Percentage of medicine and vaccine availability in community health center (Puskesmas)
		Maternal and children nutrition	Prevalence of Stunting / Wasting in children under 5 years
			Under-five Mortality per 1,000 live births
		Health care education	Regulation assuring female aged 15-49 years old to have sufficient knowledge about sexual health
			Percentage of women in productive age who needs family planning and use modern contraceptives
	Environment	Water access	Percentage of household who has access to clean and sustainable drinking water
			Number of cities who has wastewater infrastructure with city/area/community scale
		Sanitation	Percentage of household who has access to proper sanitation
		Pollution	Proportion of safely managed liquid waste
			Numbers of recycled waste, including plastics
			Proportion of solid waste collected and processed in a city
			Amount of B3 (hazardous waste) managed in the industrial sector
			Air polluted level
	Social support	Social assistance	Number of people who receive low income support program
			Percentage of population live below poverty line
		Social insurance	Budget percentage for national social protection expense
			Proportion of labor insurance membership
			Percentage of people who has JKN/insurance membership
Health care	Health care infrastructure	Pharmaceuticals	Increasing the effectiveness of drug and food administration
		Medical devices	Sufficiency and increasing the competitiveness of pharmaceutical and medical devices availability
		Hospitals	Number of healthcare units/facilities
	Health care access	Access to detection	% early detection for critical deseases
		Access to doctor	% access to appropriate health care

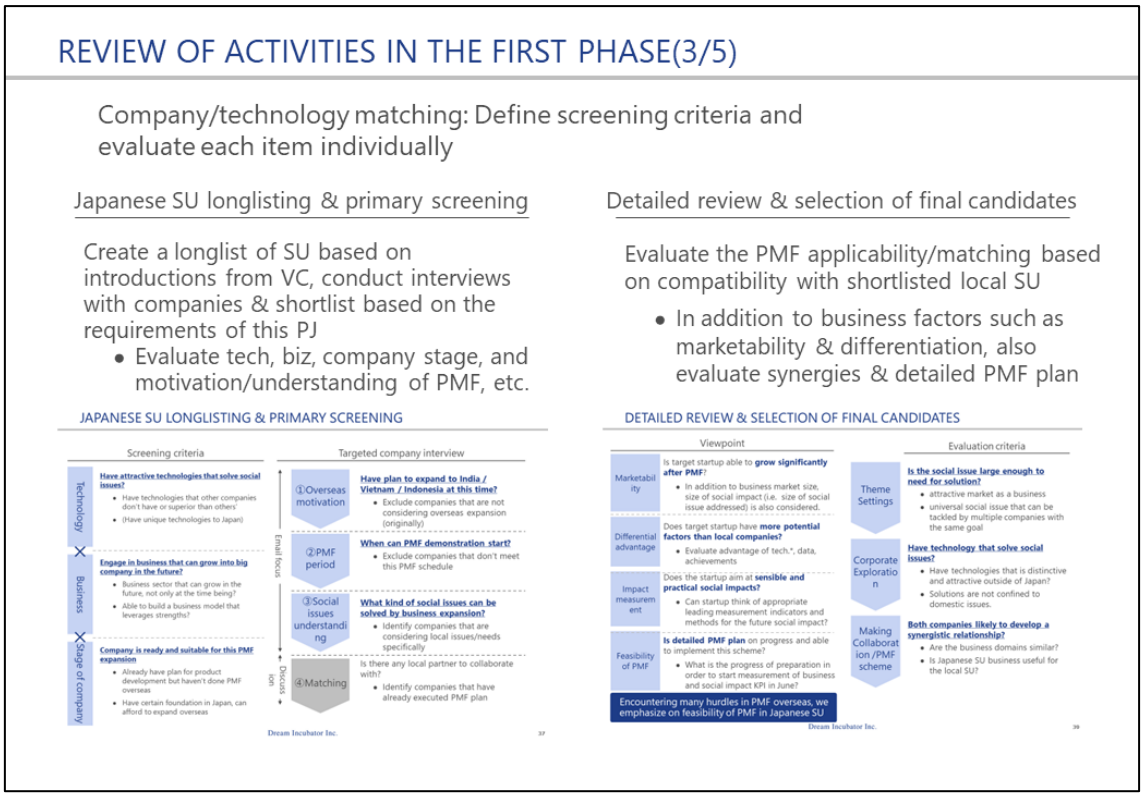
【Figure 3-7-1: Review of structural analysis of social issues】

(Expanded version of the left table is in Appendix D-1)

With a longlist prepared with VC and accelerators, the local startup part and Japanese startup part is evaluated individually by establishing screening criteria in the same way. Details of the selection process for local startup part and Japanese startup part are shown in the following two figures respectively.

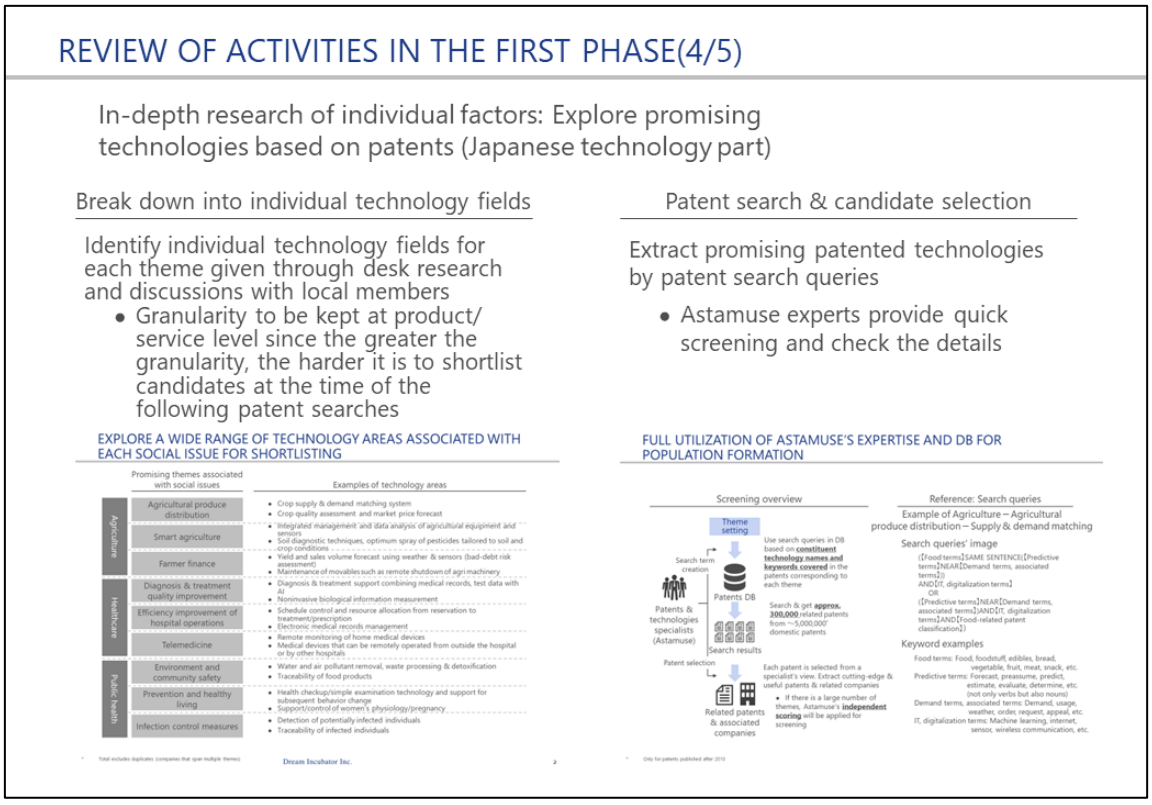


【Figure 3-7-2: Screening process of the local startup part】



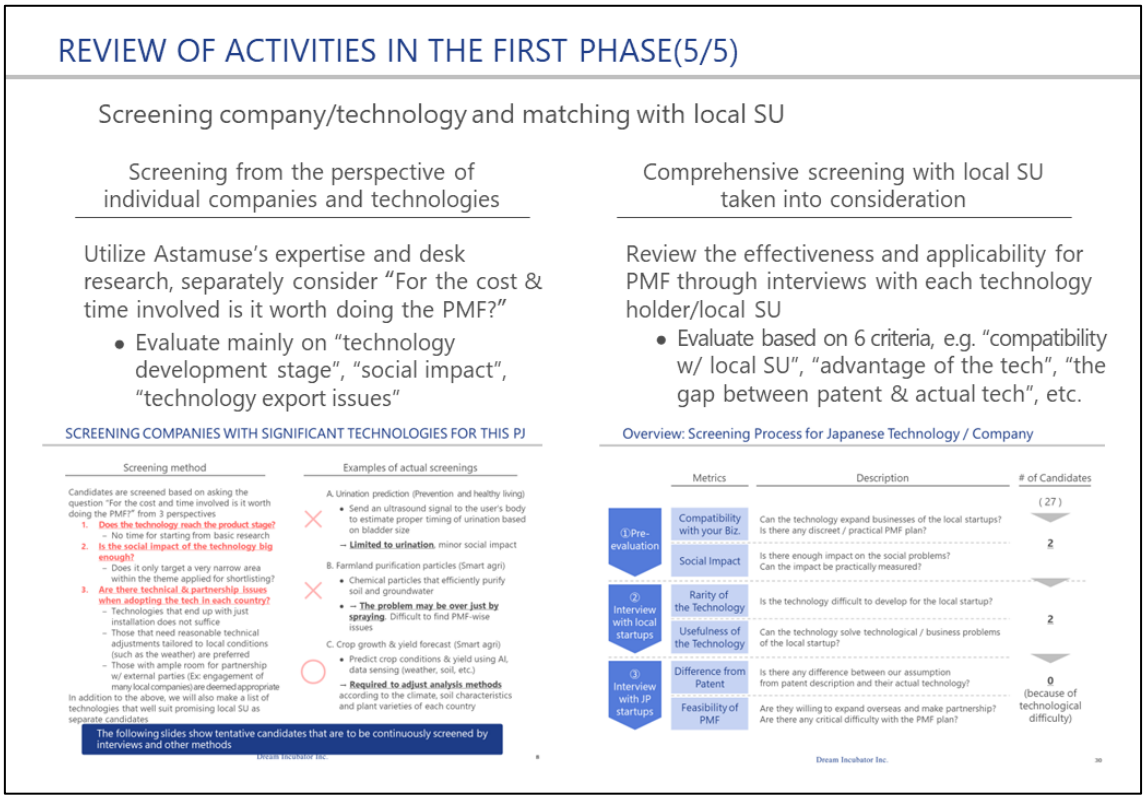
【Figure 3-7-3: Screening process of the Japanese startup part】

Then, from the specific themes selected in the former process, we came to identify separate technical themes and used those to search for corresponding technologies from the patent database (below figure).



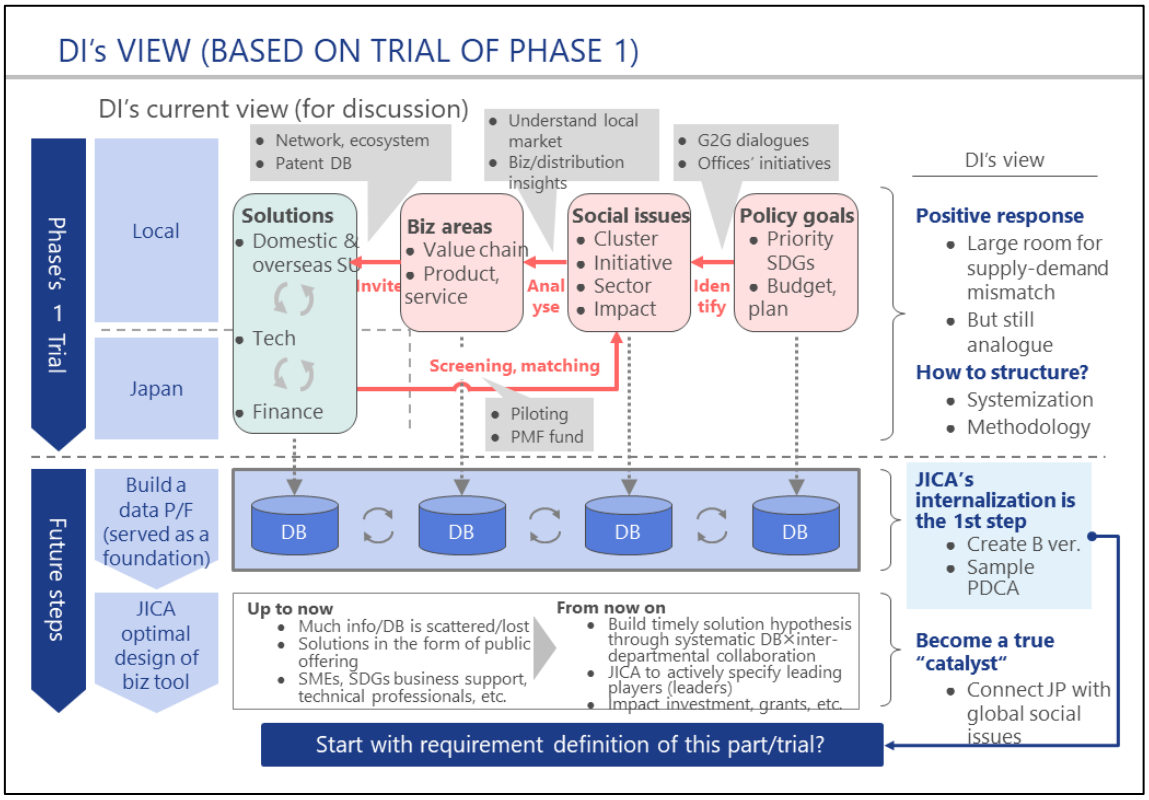
【Figure 3-7-4: Technical theme selection process for the Japanese technology part】

Screening criteria for potentially matched technologies and respective technology holders are set forth subsequently. Individual evaluations and assessments are carried out accordingly. See below figure for details of the evaluation criteria.



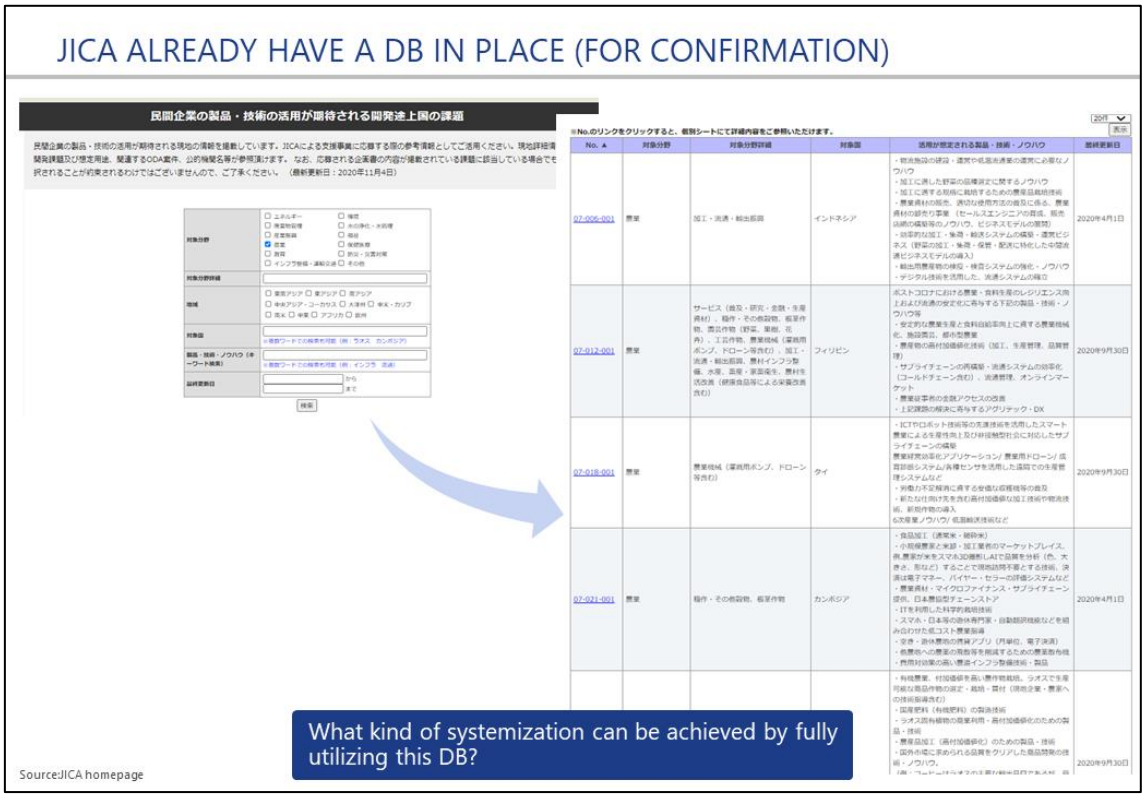
【Figure 3-7-5: Screening process for the Japanese technology part】

During the above process sequence of Phase 1, we have received positive response from local startup. The methodology adopted has been recognized to a certain extent. To further expand this initiative, in Phase 2 we aim to systemize the processes, expedite JICA's initiatives as a true catalyst that can respond flexibly and proactively to various social issues by internalizing all within JICA (below figure).



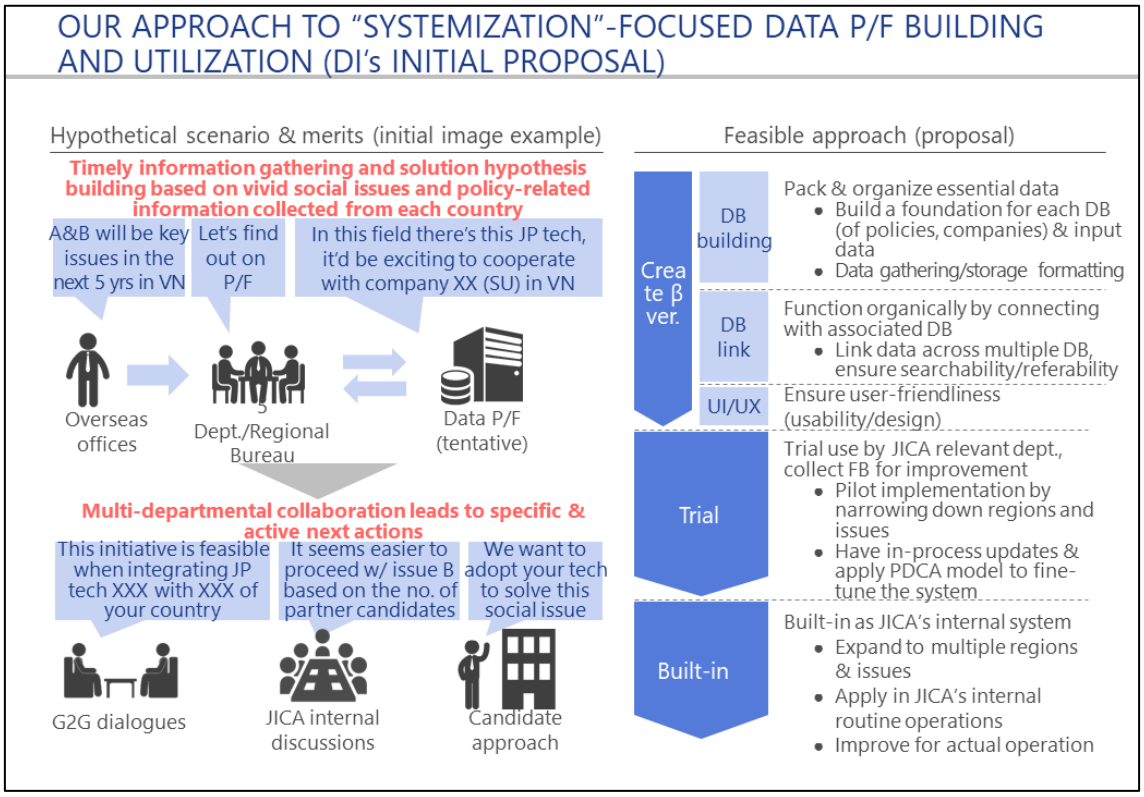
【Figure 3-7-6: Know-how accumulated from Phase 1 and systemization steps (tentative)】

As JICA already has a database related to SDGs, the systemization process will be promoted using said database (below figure).



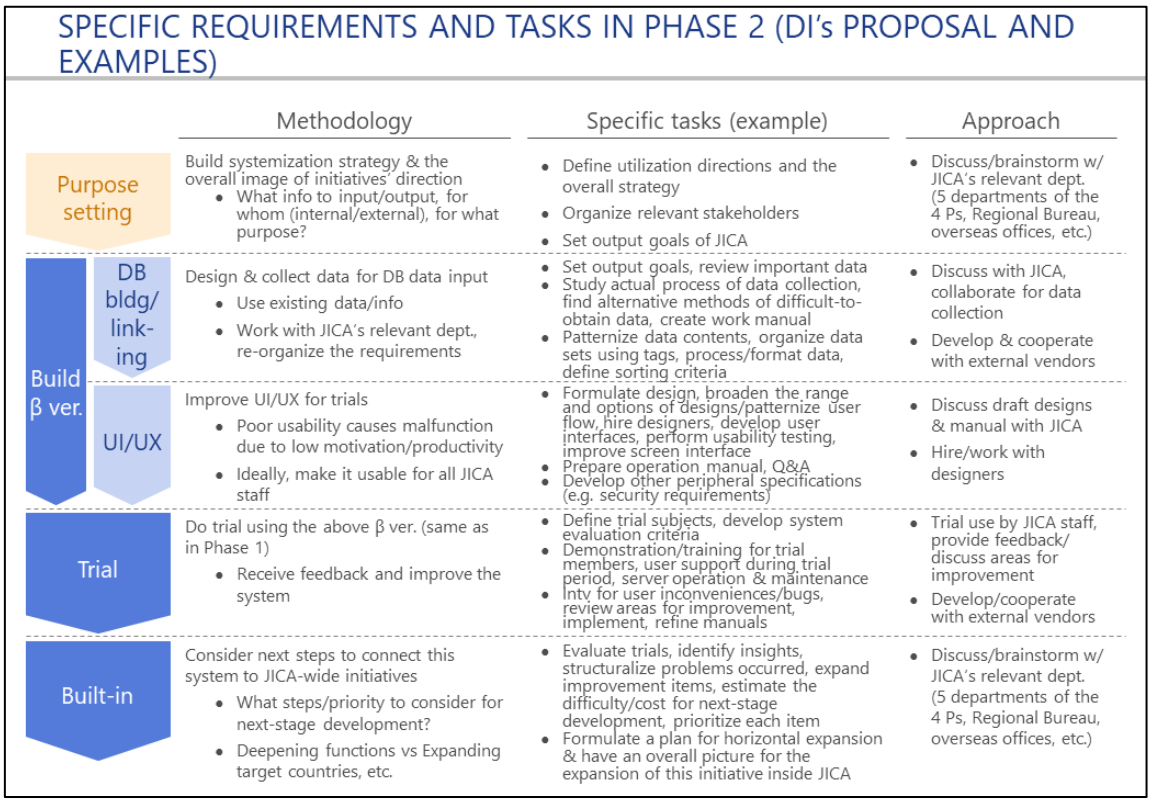
【Figure 3-7-7: JICA's database】

A potential scenario of P/F utilization is shown on the left side of the figure below. Through this system, JICA's local staff can timely obtain information relating to technologies and companies from available data, and can take specific actions such as G2G dialogues, internal discussions, and cooperation with various stakeholders. To realize this, we will develop a β version focusing on building a database, do trials, fine-tune, and deliver the final built ins.



【Figure 3-7-8: Initial proposal of data P/F construction and utilization approach toward systemization】

There are many issues to be considered for systemization. The following figure details what to be considered in Phase 2 and the time period estimated for building such a system. Generally speaking, we start from defining the purpose, then fulfill individual specific criteria in a way that conforms to the approach shown in the above figure.



【Figure 3-7-9: Detailed requirements for systemization (Phase 2)】

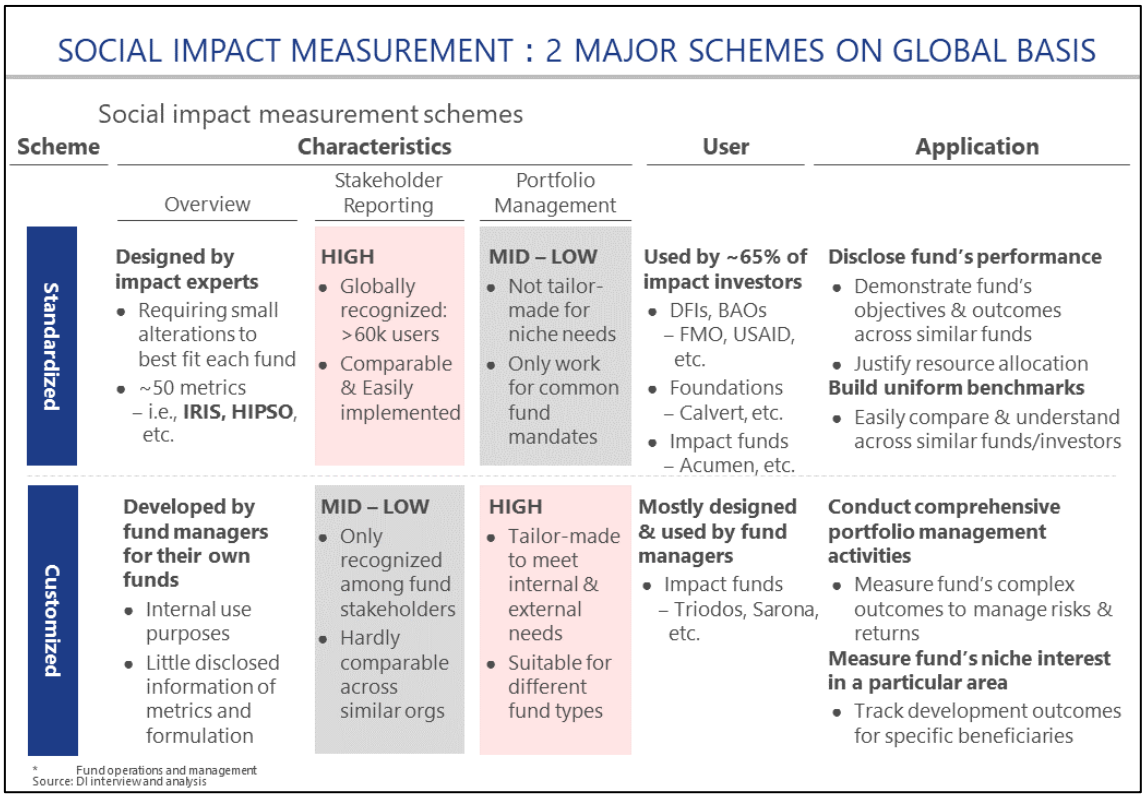
Chapter 4. PMF verification plan for Japanese and local startups

DI assisted the selected startups in developing their PMF verification plans. Through multiple discussions with each startup, we proposed the location of the verification, the partner, and the time schedule, budget, and implementation system. In addition, when matching Japanese and overseas startups, DI not only introduced them, but also provided hands-on support in building the collaboration scheme and directing the plan documents in the form of a PMF verification plan. Due to confidentiality agreements with the companies, the PMF planning documents will not be included.

Chapter 5. Impact evaluation framework and measurement methods

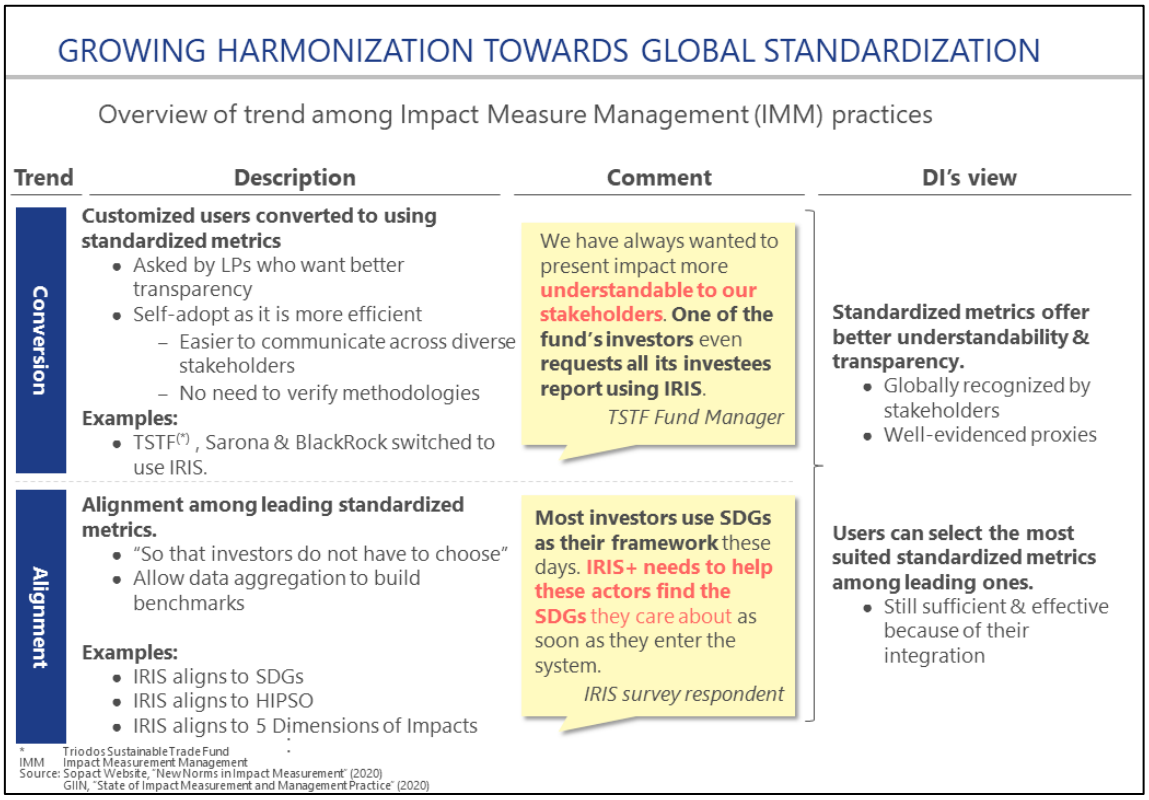
5-1 Review of global metrics

There are many social impact indicators. They are broadly categorized into 2 schemes as shown below. One is called standard scheme designed by experts and used globally. The other is a customized scheme designed by fund managers specifically used for each fund.



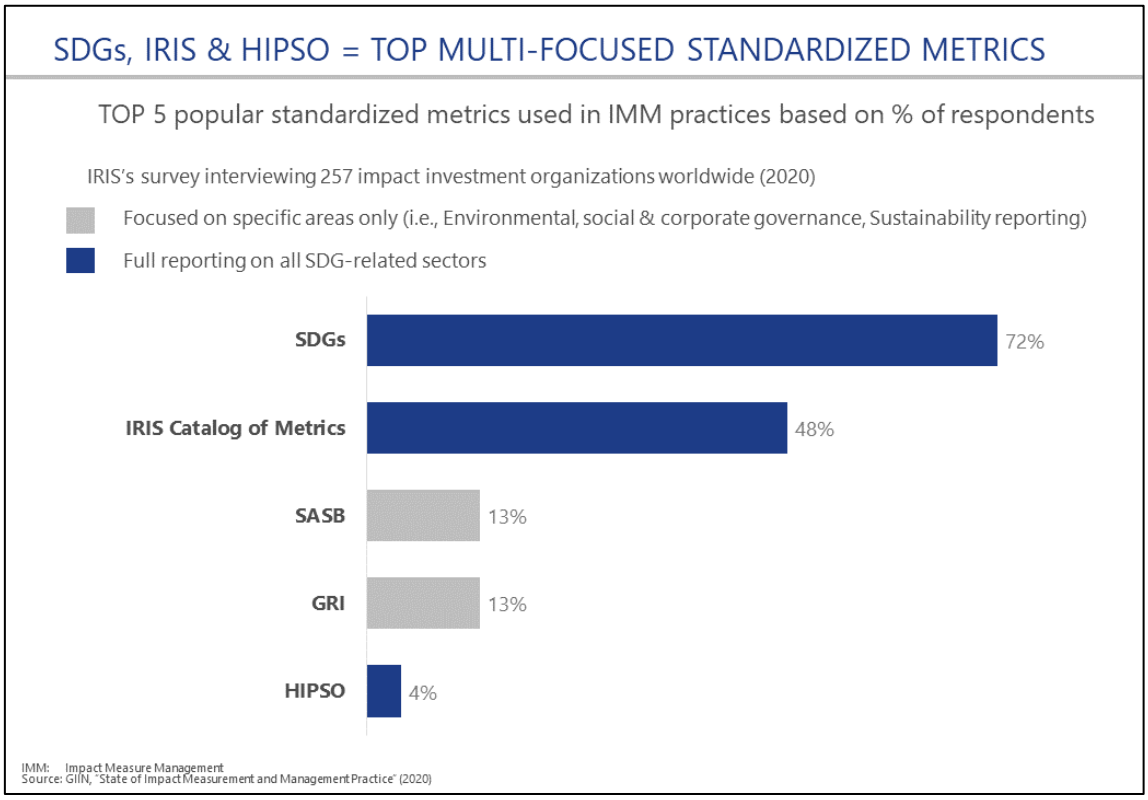
【Figure 5-1-1: Social impact measurement schemes】

Besides, there is an ongoing trend of unifying various indicators for standardization. Major trends include switching from customized indicators to standard ones or establishing consistency of several standard indicators.

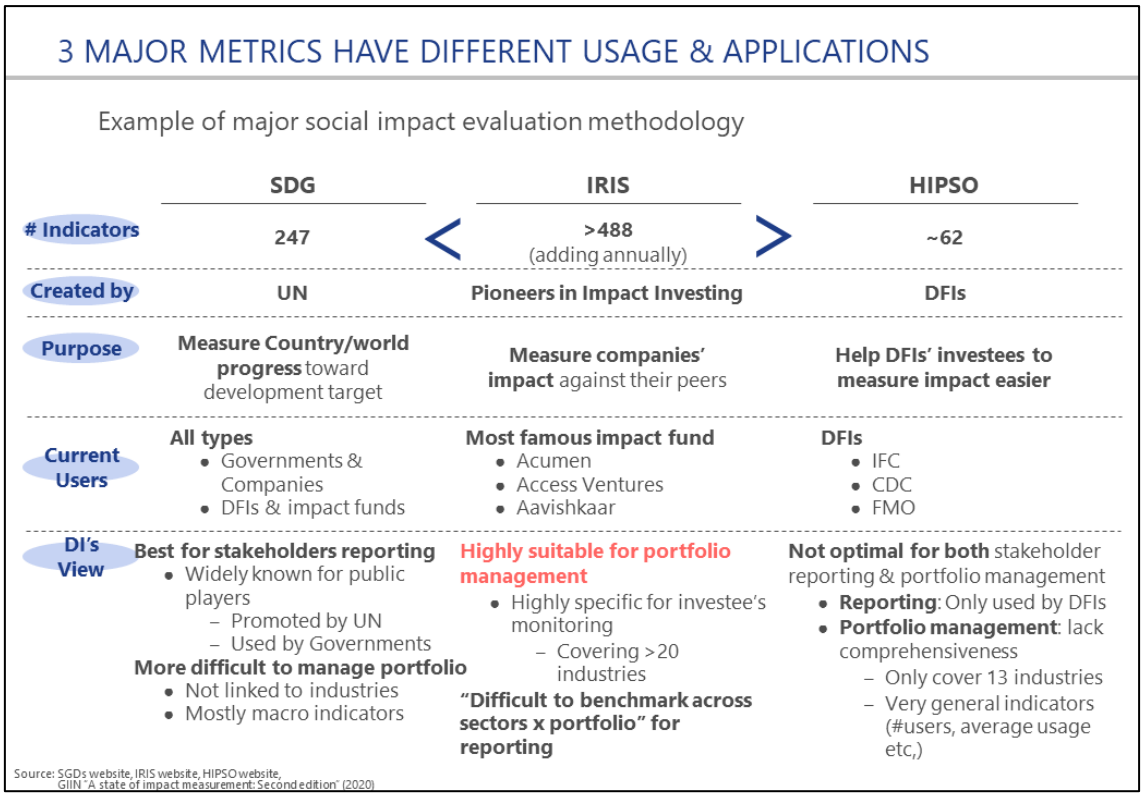


【Figure 5-1-2: Social impact measurement standardization trends】

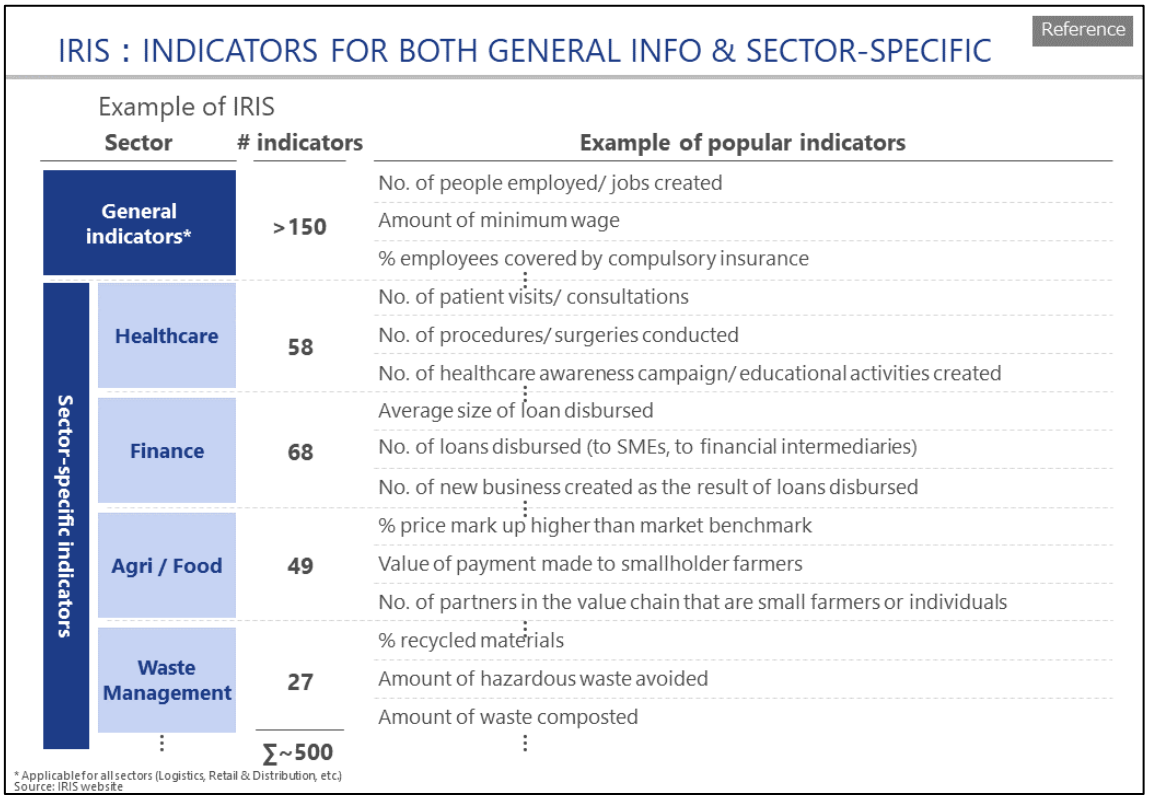
In particular, SDGs, IRIS, HIPSO are commonly used as standard metrics that can be applied to several sectors. Following figure presents characteristics of major metrics. Among those, IRIS metrics is a superb tool for fund management that set up detailed indicators corresponding to the SDGs by sector.



【Figure 5-1-3: Major social impact metrics】

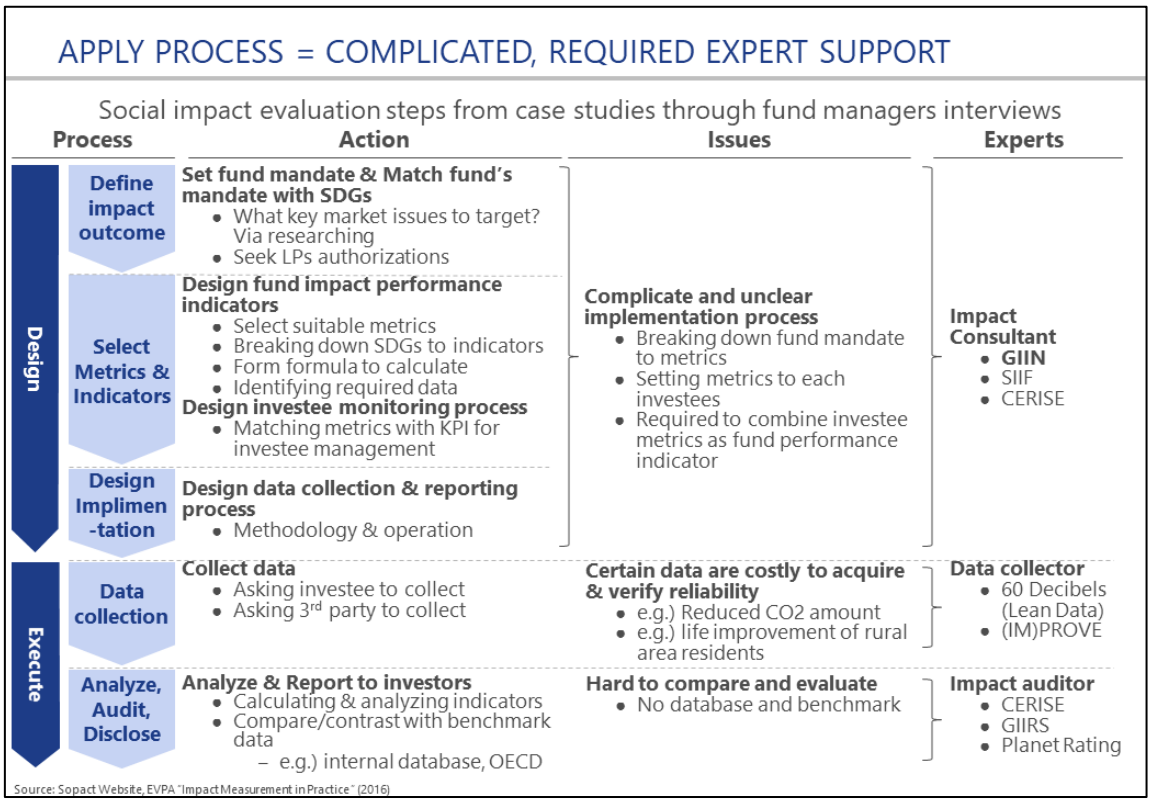


【Figure 5-1-4: Overview of each social impact metrics】



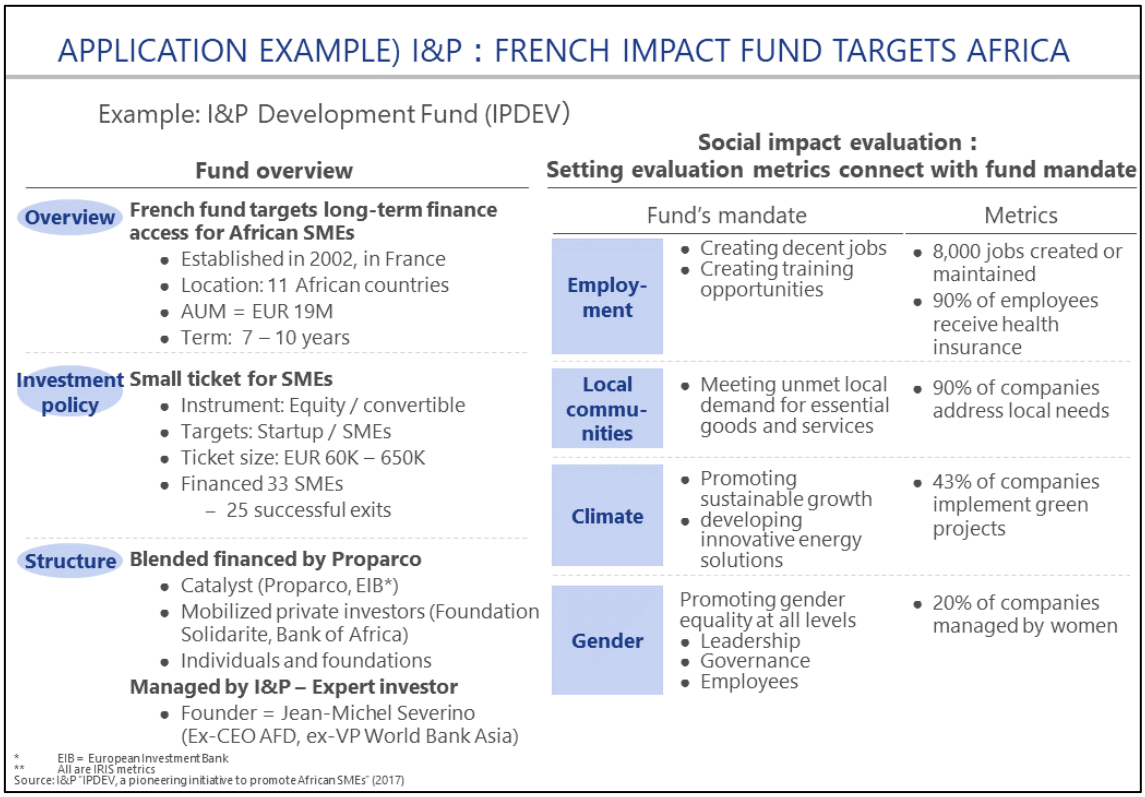
【Figure 5-1-5: Example of IRIS metrics】

Various hurdles exist in measuring social impact, such as the fact that the metrics and measurement methods are not unified as mentioned above. Therefore, it is common to hire external experts for the design and operation of the measurement process. The following figure describes in detail the processes, challenges, and examples of external experts.

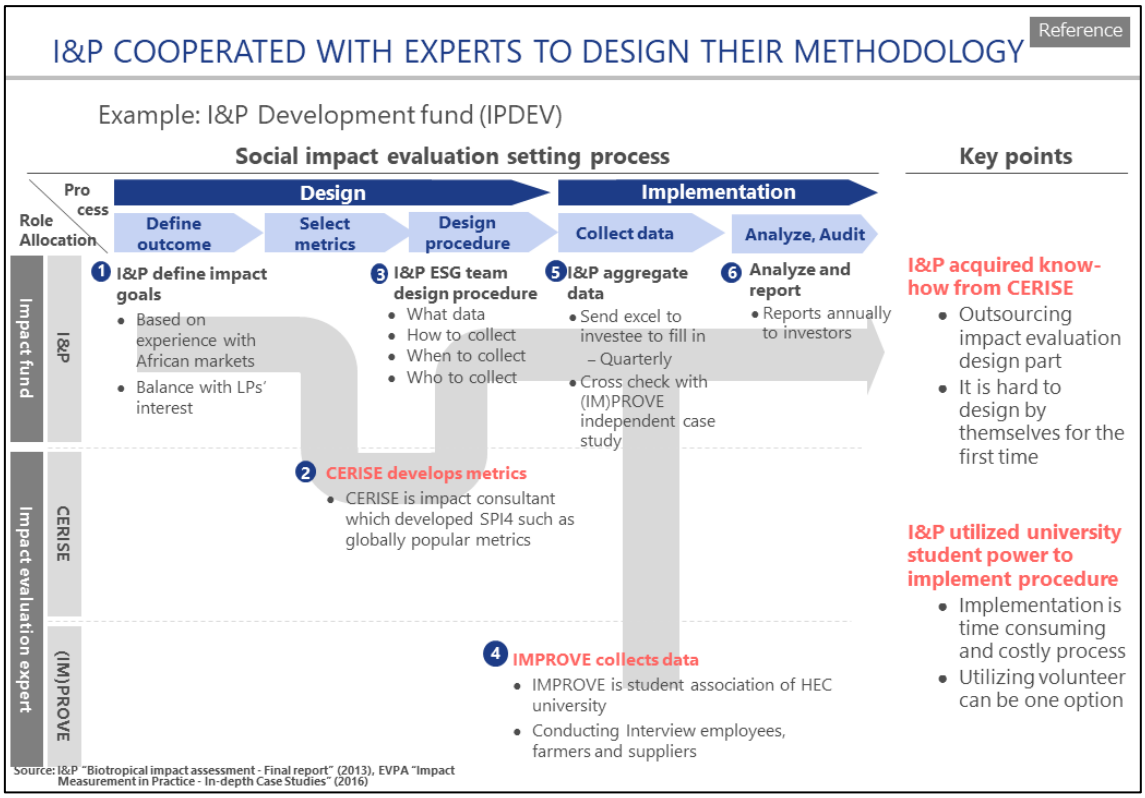


【Figure 5-1-6: Overview of social impact evaluation process】

The below figure demonstrates a case study of I&P Development Fund in which an impact measurement system is developed by external experts. The social impact investment fund I&P Development Fund was established in 2002 targeting Africa. This fund is also working with external experts to build an impact measurement system, as shown in following figure.



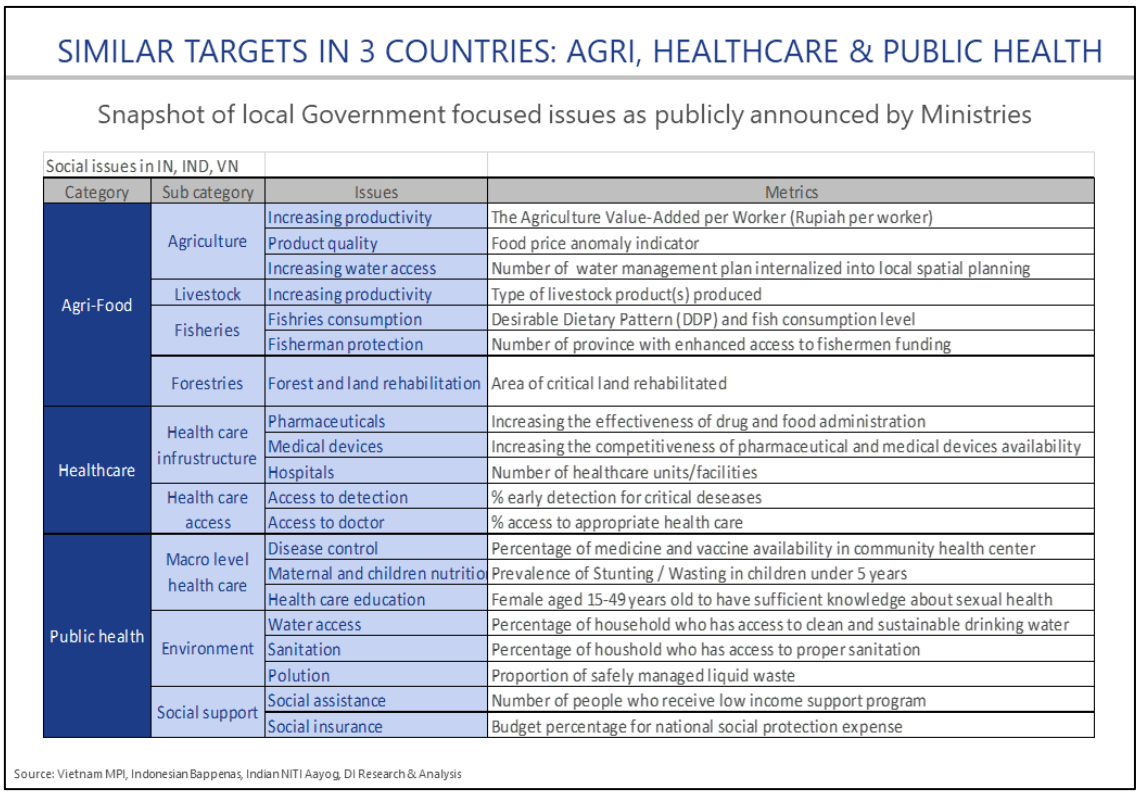
【Figure 5-1-7: Overview of I&P Development Fund】



【Figure 5-1-8: I&P Development Fund's impact measurement system building】

5-2 Narrowing areas of focus in target countries

Following figure summarizes the policy goals of agriculture, healthcare, and public health in the three countries covered by the project. The same goals are set forth by all three countries, which demonstrates a great compatibility with our project goals.



SIMILAR TARGETS IN 3 COUNTRIES: AGRI, HEALTHCARE & PUBLIC HEALTH

Snapshot of local Government focused issues as publicly announced by Ministries

Social issues in IN, IND, VN

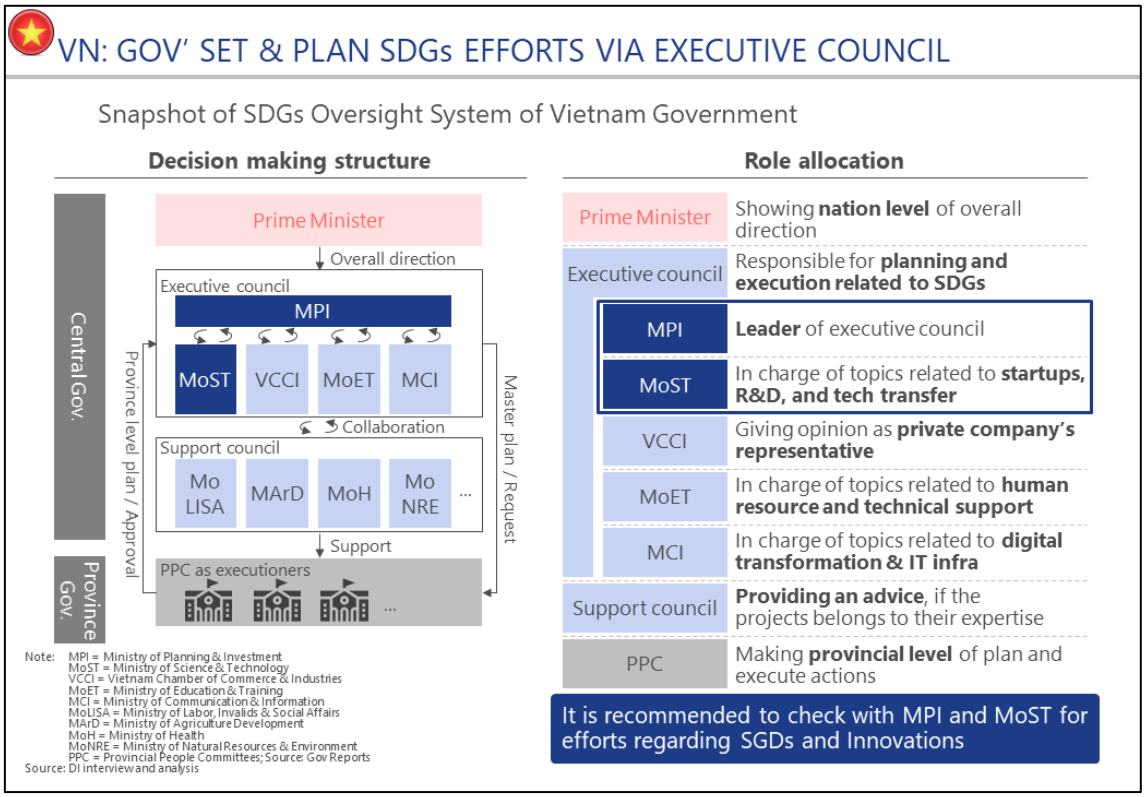
Category	Sub category	Issues	Metrics
Agri-Food	Agriculture	Increasing productivity	The Agriculture Value-Added per Worker (Rupiah per worker)
		Product quality	Food price anomaly indicator
		Increasing water access	Number of water management plan internalized into local spatial planning
	Livestock	Increasing productivity	Type of livestock product(s) produced
	Fisheries	Fishries consumption	Desirable Dietary Pattern (DDP) and fish consumption level
		Fisherman protection	Number of province with enhanced access to fishermen funding
	Forestries	Forest and land rehabilitation	Area of critical land rehabilitated
Healthcare	Health care infrustructure	Pharmaceuticals	Increasing the effectiveness of drug and food administration
		Medical devices	Increasing the competitiveness of pharmaceutical and medical devices availability
		Hospitals	Number of healthcare units/facilities
	Health care access	Access to detection	% early detection for critical deseases
		Access to doctor	% access to appropriate health care
Public health	Macro level health care	Disease control	Percentage of medicine and vaccine availability in community health center
		Maternal and children nutritio	Prevalence of Stunting / Wasting in children under 5 years
		Health care education	Female aged 15-49 years old to have sufficient knowledge about sexual health
	Environment	Water access	Percentage of household who has access to clean and sustainable drinking water
		Sanitation	Percentage of houshold who has access to proper sanitation
		Polution	Proportion of safely managed liquid waste
	Social support	Social assistance	Number of people who receive low income support program
		Social insurance	Budget percentage for national social protection expense

Source: Vietnam MPI, Indonesian Bappenas, Indian NITI Aayog, DI Research & Analysis

【Figure 5-2-1: Policy goals of target countries (agriculture, healthcare, public health)】

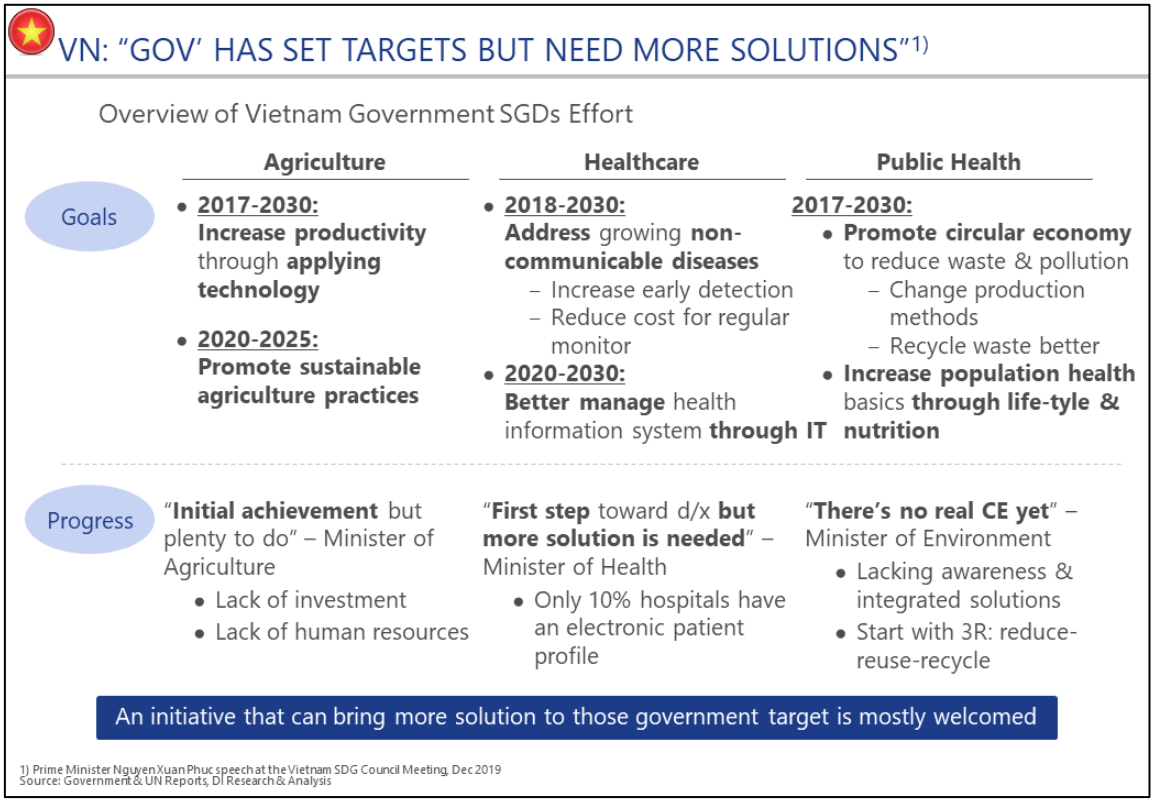
The policy goals of each country and current situation are described accordingly.

Following figure provides an overview of Vietnam's SDGs-related system. More than 10 entities in the central government alone are working together. Cooperating with MoST (in charge of MPI, startups and R&D, etc. as the head of the Administrative Council) is of great importance in promoting this project.



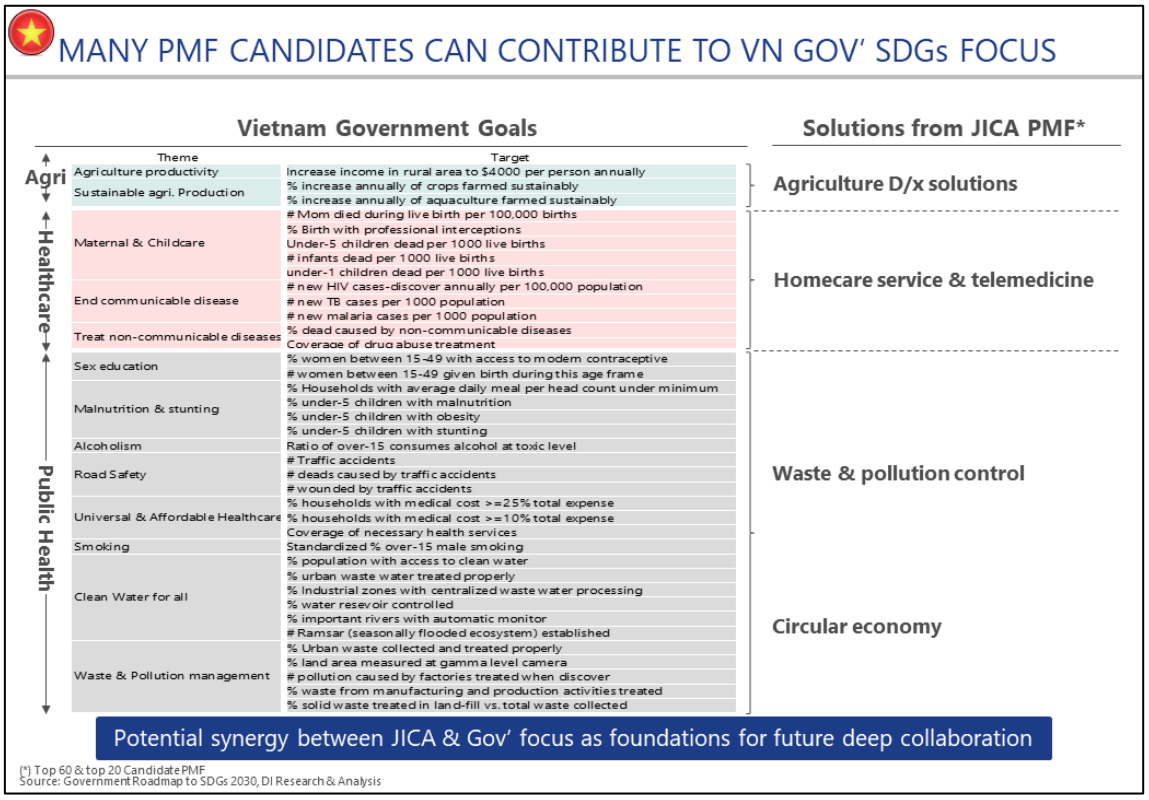
【Figure 5-2-2: Overview of Vietnam's SDGs-related system】

Vietnam's policy goals of three areas are as indicated earlier, the progress, however, is quite discouraging, and the problem is a lack of solutions. Offering specific solutions through this initiative and taking the lead in such stagnant situation can be very valuable. The current situation in each area is shown in following figure.



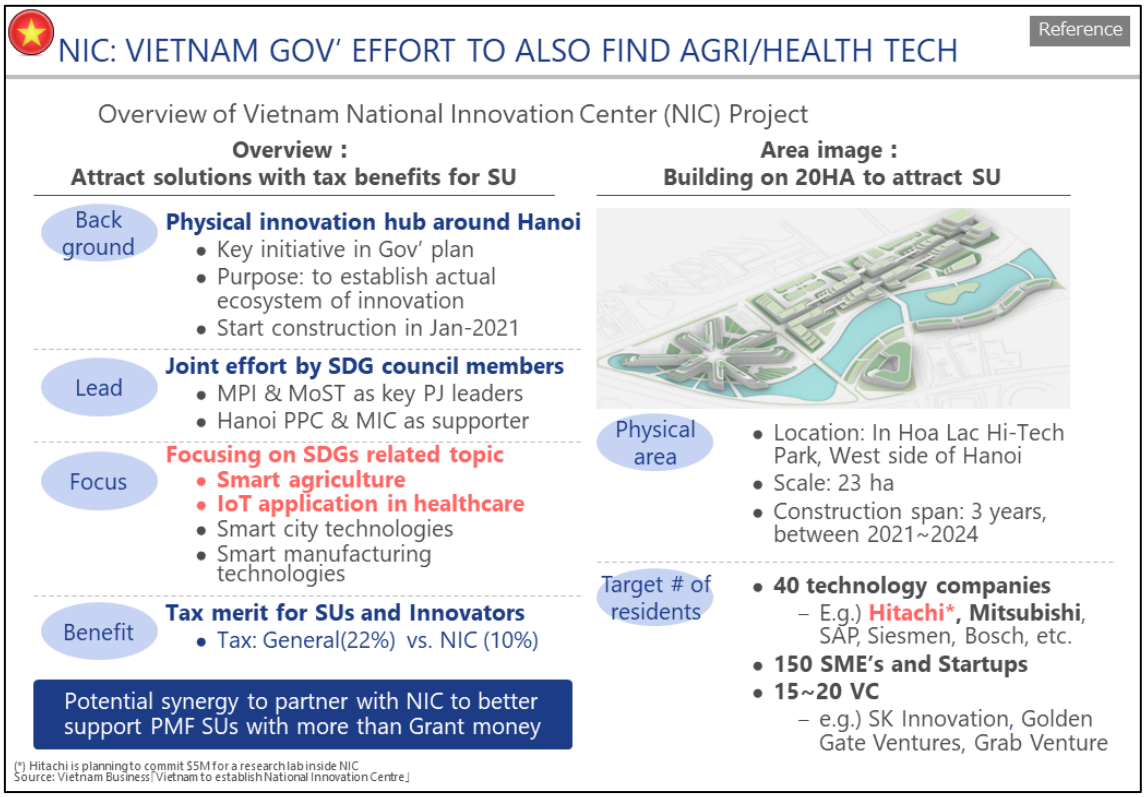
【Figure 5-2-3: SDGs-related initiatives of the Government of Vietnam】

In fact, some local startup and Japanese startup which are the PMF candidates satisfy Vietnam's policy goals. Following figure shows a list of PMF candidates that match each policy goal.



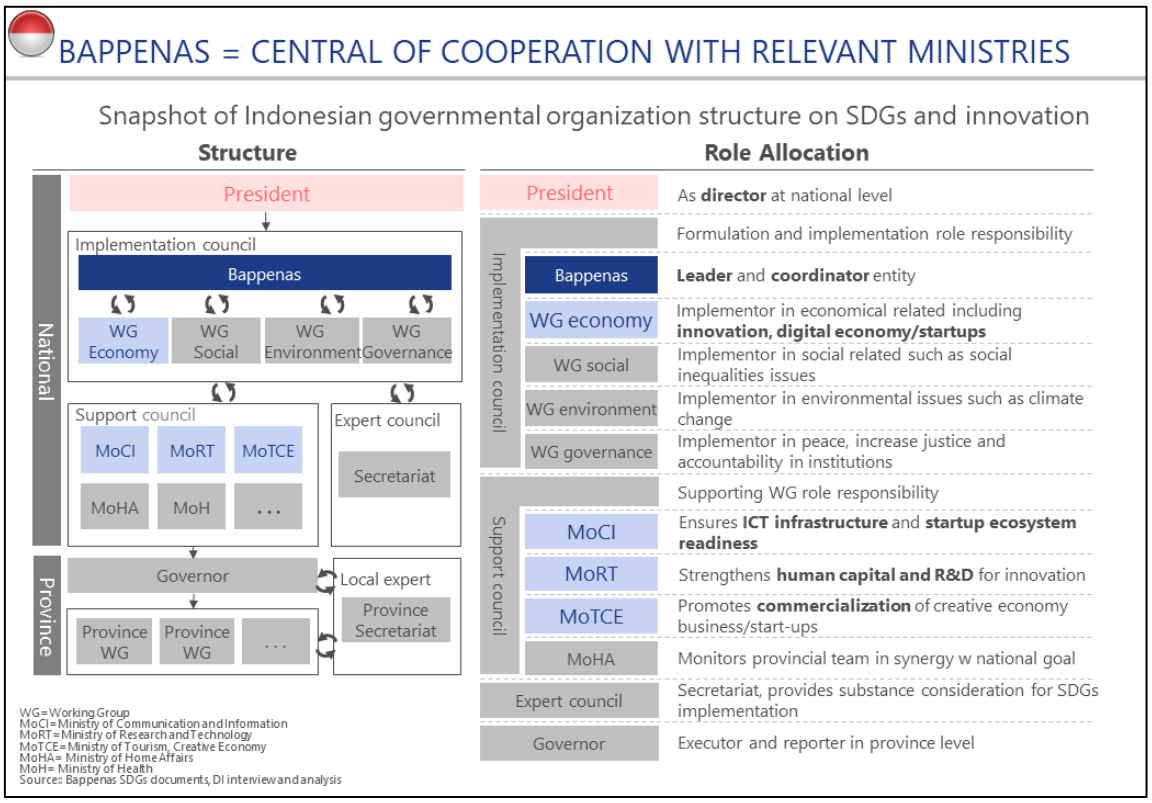
【Figure 5-2-4: Theme of PMF candidates that correspond to the goals of the Government of Vietnam】

In Vietnam, NIC (National Innovation Center) is being constructed as a base for attracting agritech and health tech. It is expected to attract many companies, including Japanese ones. There is room for considering NIC as a partner candidate for this project. Following figure shows NIC's overview.



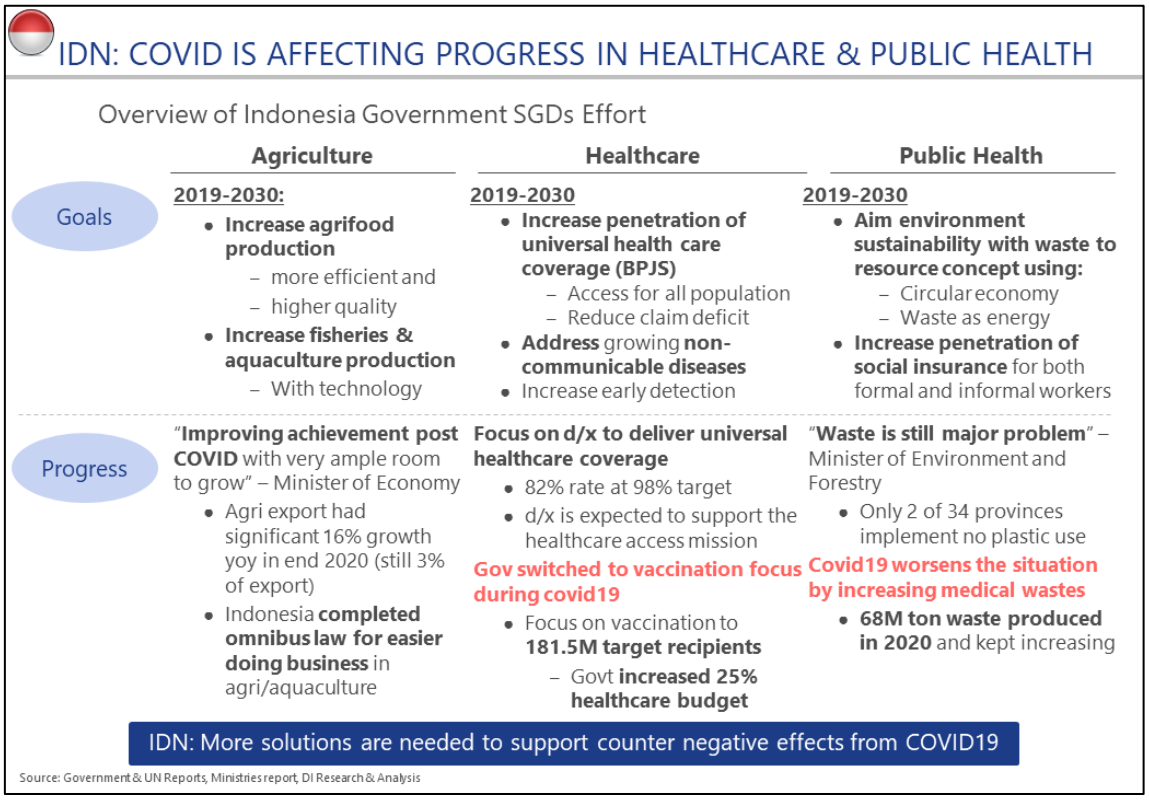
【Figure 5-2-5: Overview of NIC】

Following figure presents the SDGs-related system of Indonesia. In Indonesia, an organization named Bappenas plays a central role in the overall supervision and cooperation with various related parties and is a very important partner when cooperating with the government with this project as the starting point. In addition, the Economic WG, which is in charge of economic innovation related policies, and MoCI, MoRT, MoTCE, which are in charge of / support related policies including the startup ecosystem, are also considered significant partners.



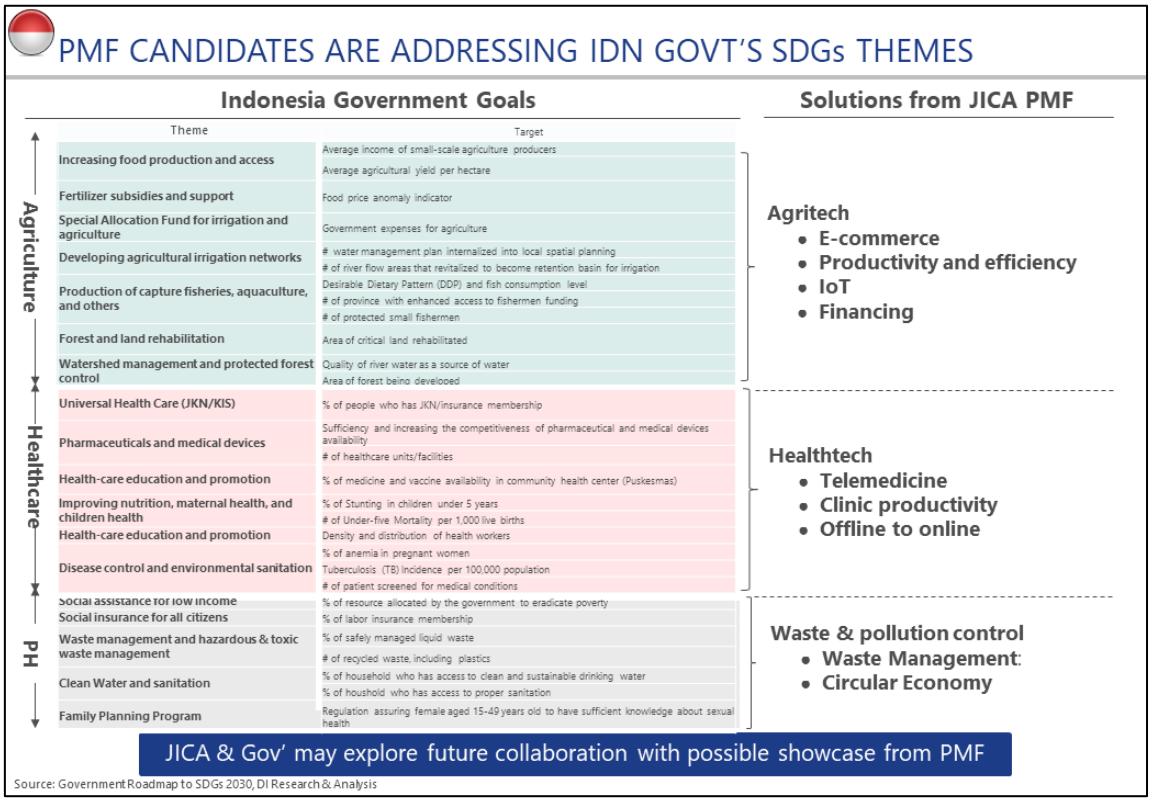
【Figure 5-2-6: Overall image of SDGs-related system of the Government of Indonesia】

The SDGs initiatives in Indonesia are on the right track, however, all areas of agriculture, healthcare, and public health have been stagnant due to coronavirus impact. Solutions and a leading role in promoting those measures are much needed. Following figure shows the current situation of SDGs-related policies in Indonesia.



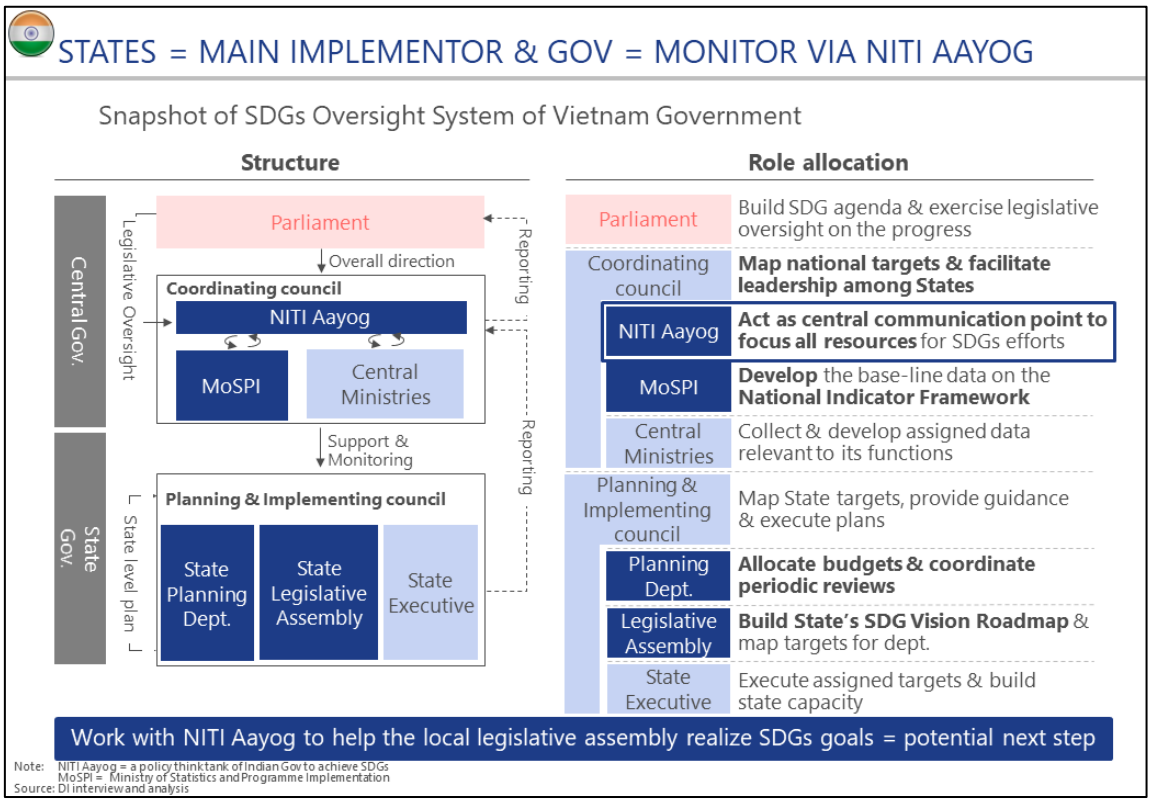
【Figure 5-2-7: SDGs-related initiatives of the Government of Indonesia】

In Indonesia, many companies that match the government's SDGs goals have been found through this project. Partnership with the government through the PMF seems feasible enough. Following figure shows a list of companies that correspond to Indonesia's government goals.



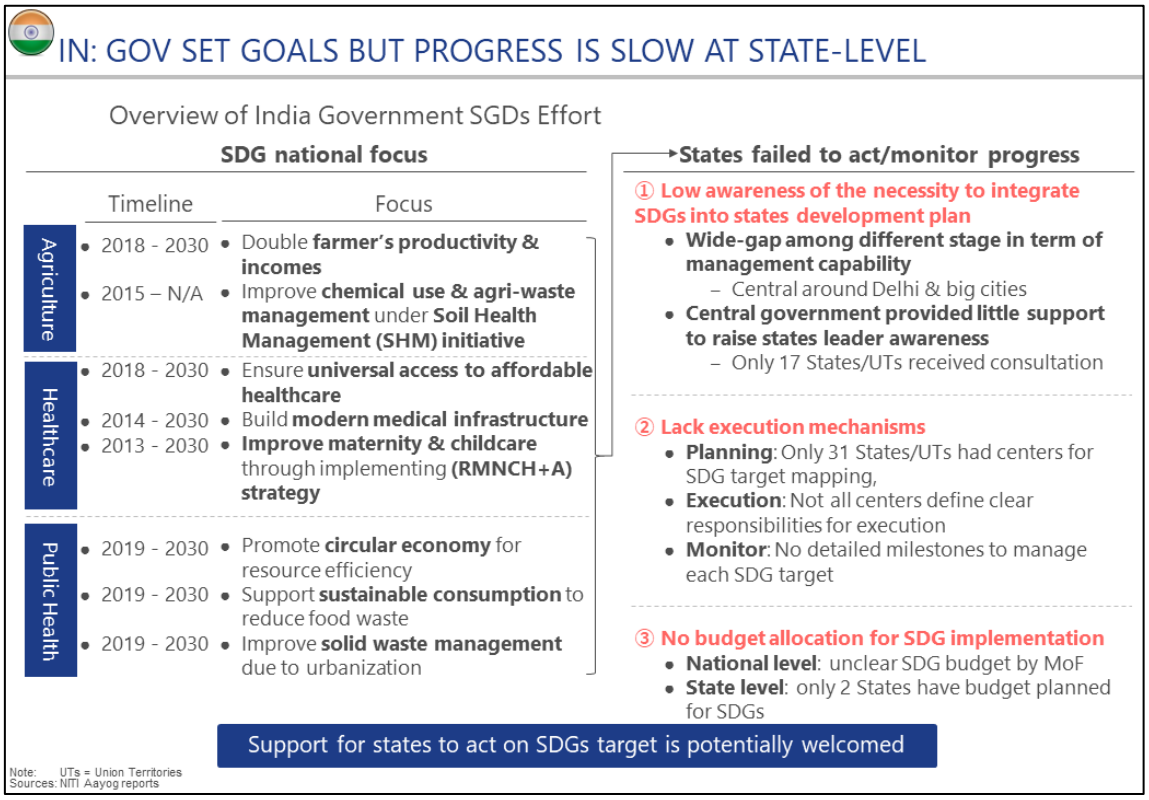
【Figure 5-2-8:Theme of　PMF candidates that correspond to the goals of the Government of Indonesia】

The SDGs-related system in India is shown in following figure. In India, the state is the main implementer of policies and measures. The government, through an organization called NITI Aayog, supervises each state and each policy/measure to ensure smooth implementation. In addition to NITI Aayog, which is the key to SDGs system, evaluation indicator organizer MoSPI, the State Planning Committee – budget allocator, and the State Legislative Assembly, which develops the SDGs roadmap for each state, are also potential partner candidates for this project. It is important to proceed PMF initiatives with these players in mind.



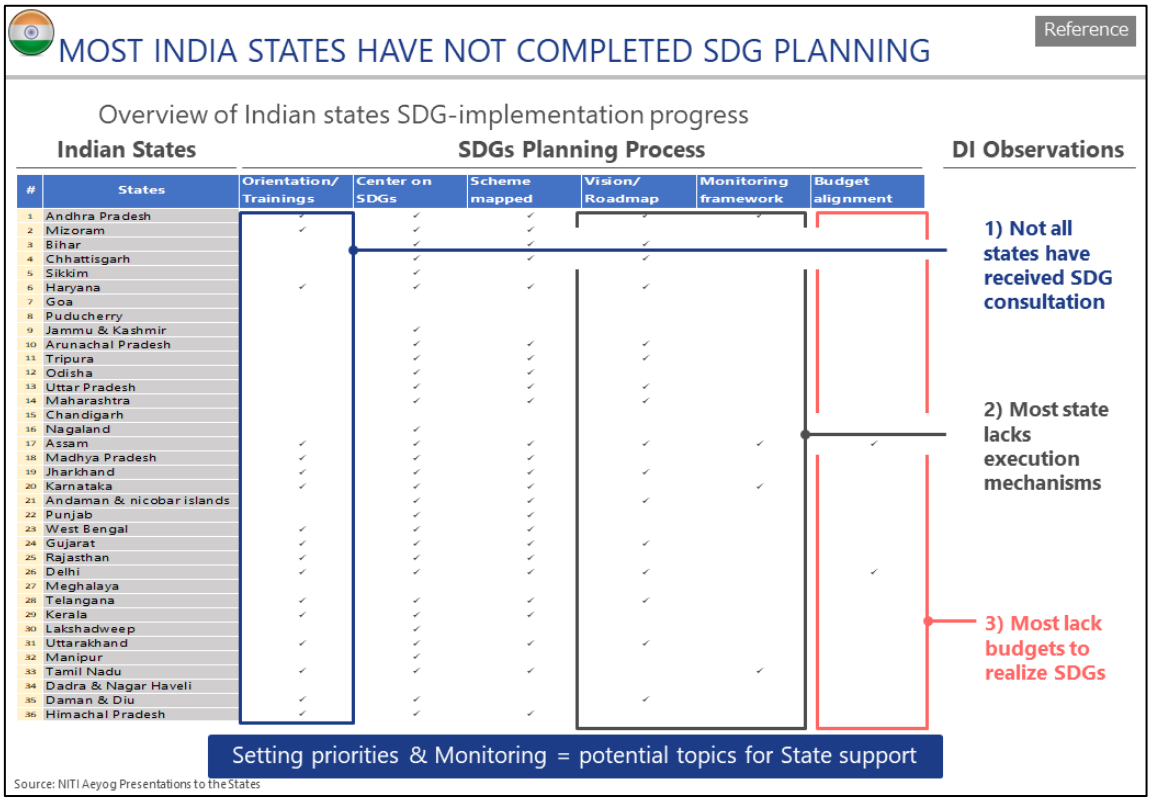
【Figure 5-2-9: Overall image of SDGs-related system of the Government of India】

In India, SDGs-related policy goals are set forth to a certain level, but the stagnation of implementation has become a challenge. There are three main reasons for this: the lack of awareness of promoting SDGs in each state (the main implementer), the absence of a policy implementation system, and insufficient allocation of related budgets. This project implementation with the states' support will greatly contribute to the delivery of the government's SDGs-related goals. The details are shown in following figure.



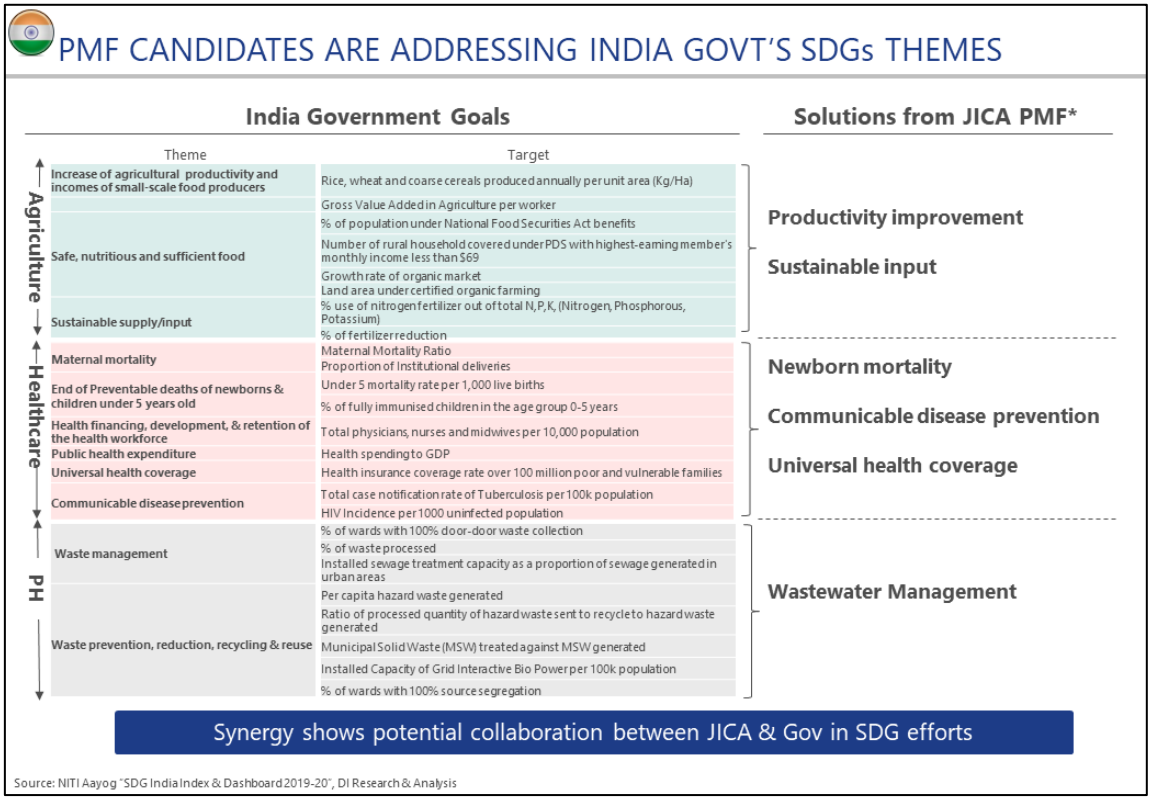
【Figure 5-2-10: SDGs-related initiatives of the Government of India】

The actual progress of SDGs in each state is as shown in following figure. Most states are not making any progress.



【Figure 5-2-11: Progress of SDGs-related plans in Indian states】

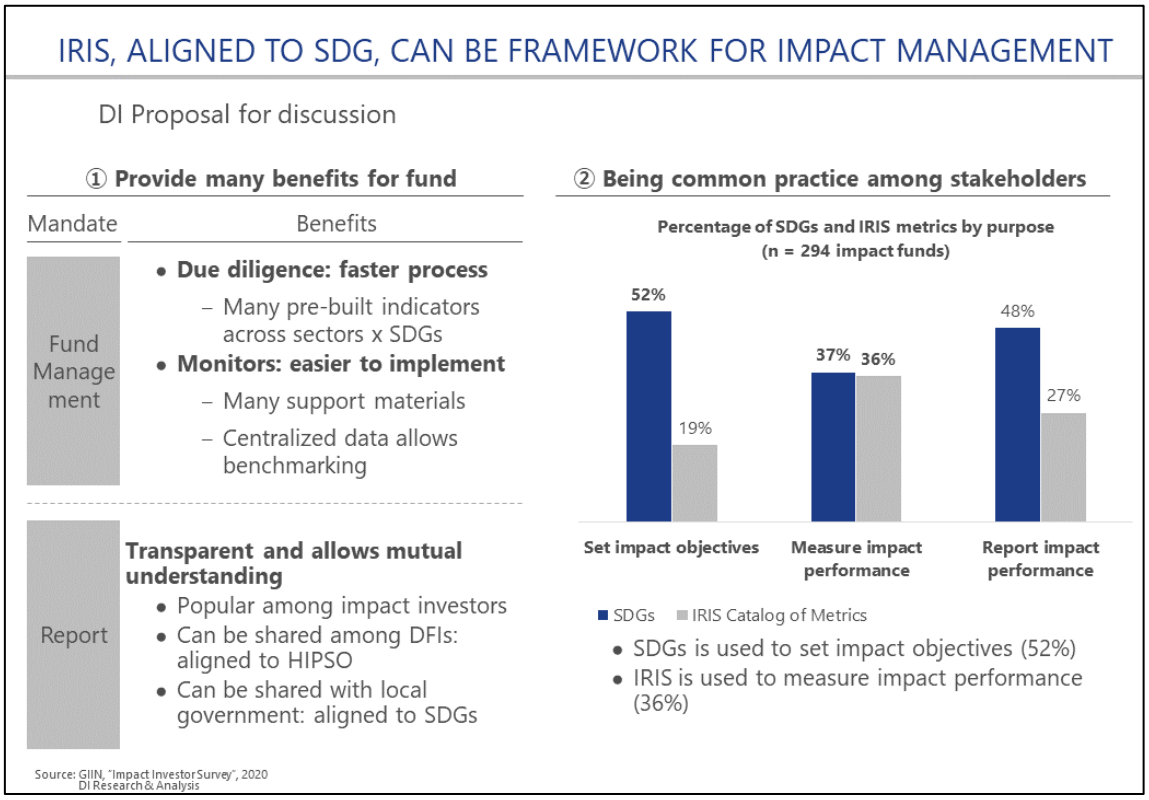
Similar to other target countries, companies that match the government goals have also been found in India. The promotion of PMF is believed to create significant added values. Following figure shows a list of companies that correspond to India's government goals.



【Figure 5-2-12: Theme of PMF candidates that correspond to the goals of the Government of India】

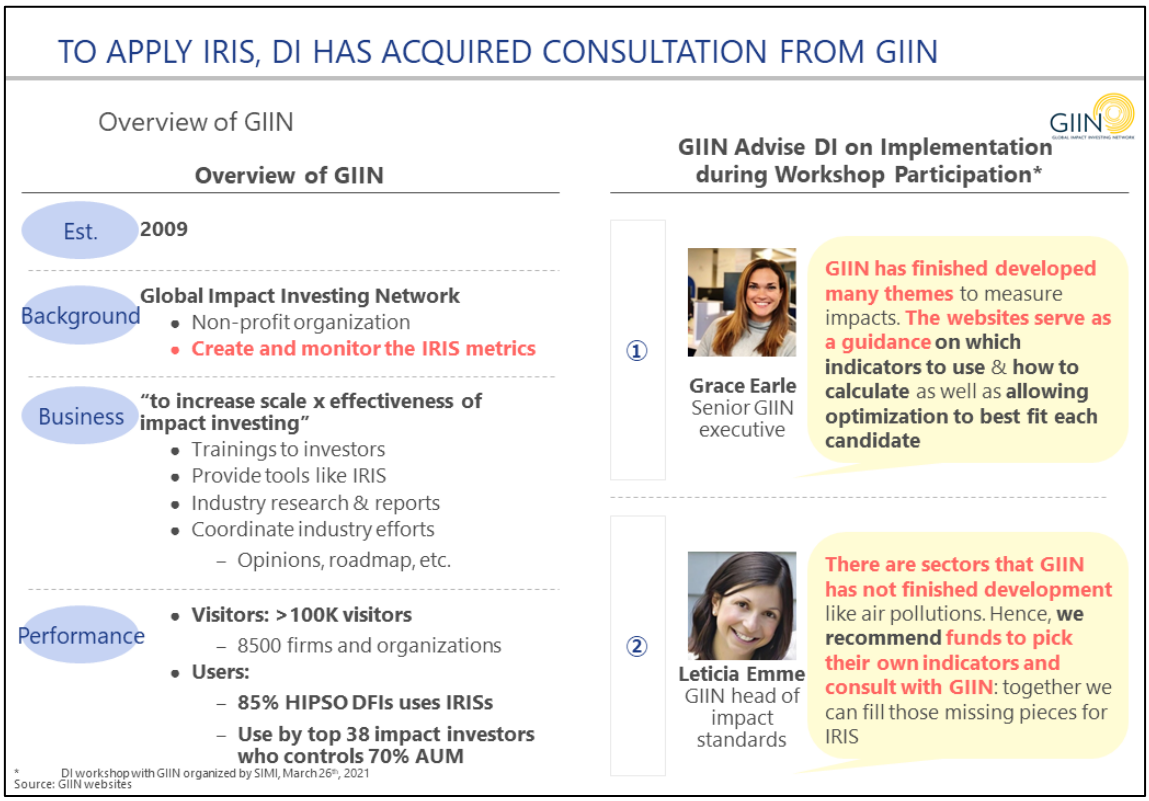
5-3 Proposed measurement methods applied to PMF candidates

IRIS is deemed effective for measuring impact for this project. IRIS is proposed not only because by its added values offered to fund operation such as improving operation efficiency, but also because of it being a common indicator for the stakeholders. Following figure shows an overview of IRIS.



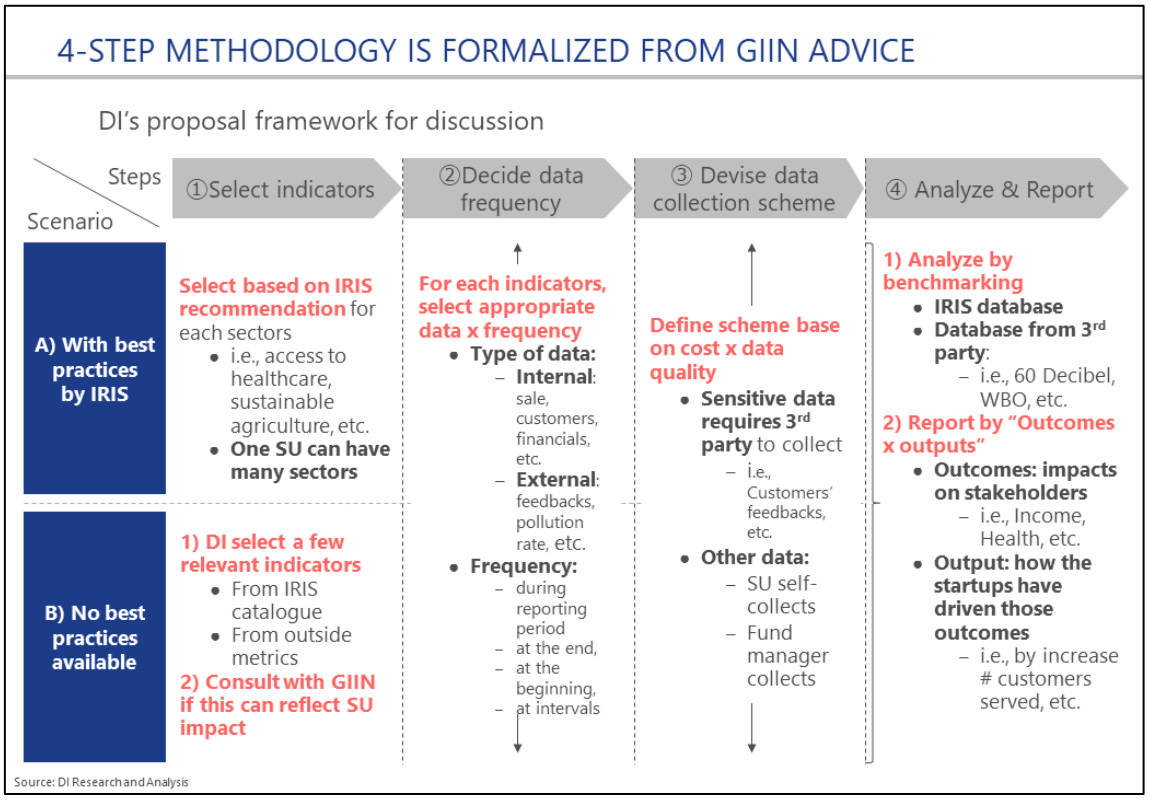
【Figure 5-3-1: Overview of IRIS metrics】

IRIS is a metrics created and monitored by the Global Impact Investing Network (GIIN), which designs evaluation frameworks for many themes. In addition to promoting the effective use of IRIS by working with GIIN in this project, it is also worth considering how GIIN will jointly design methods for yet-to-be-developed themes. Following figure shows an overview of GIIN.



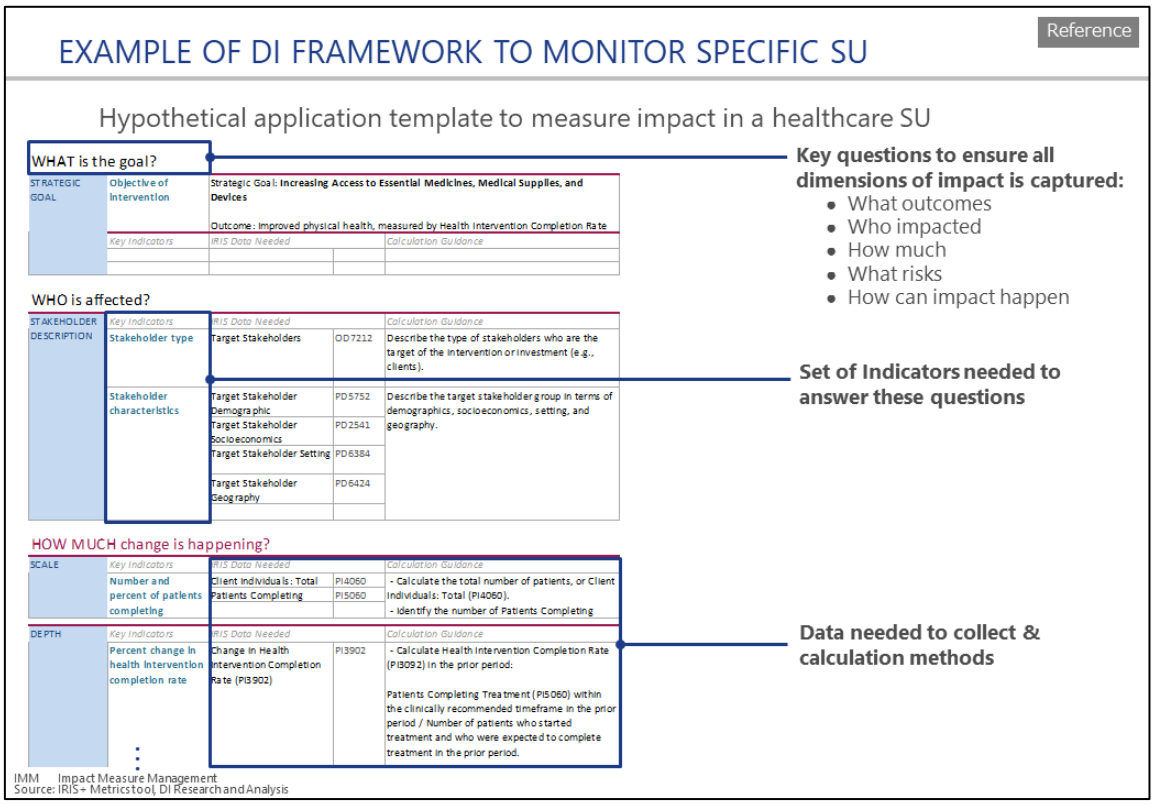
【Figure 5-3-2: Overview of GIIN】

We have received comments from GIIN on this initiative. To implement this project, we DI have designed a framework for establishing impact measurement indicators accordingly. The design process is carried out in four main steps: "selection of indicators", "determining the frequency of data acquisition", "formulation of data collection scheme", and "analysis and reporting". Detailed measurement and assessment will be carried out together with the use of existing IRIS best practices as appropriate. The details of each step are shown in following figure.



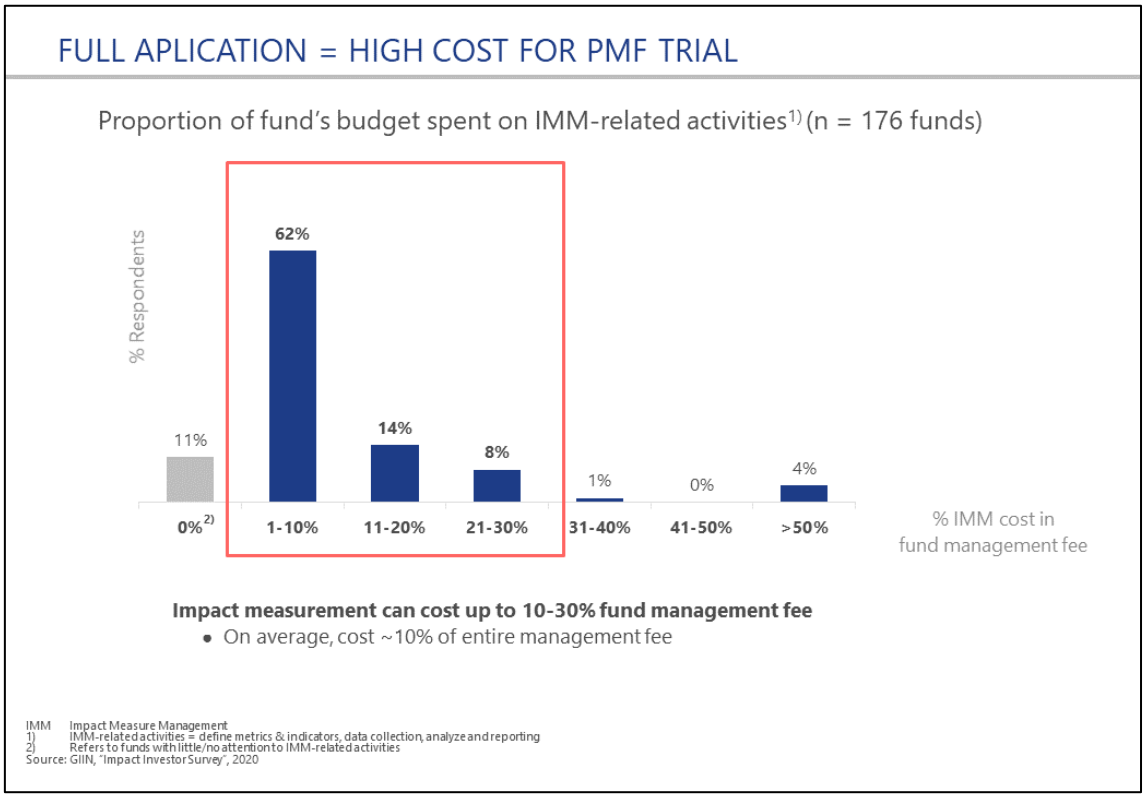
【Figure 5-3-3: Impact measurement indicator establishment framework】

In addition to the above framework, we created a startup report template considering IMM (Impact Measurement and Management) method and adopted IMP (Impact Management Project) constructed by 5 dimensions (What, Who, How much, Risk, Contribution). The following figure presents an example of our template. The template is designed in a way that individual items within the above framework are fulfilled by answers to each item. Exchanges and cooperation with each startup are supposed to be made using this template (proposal).



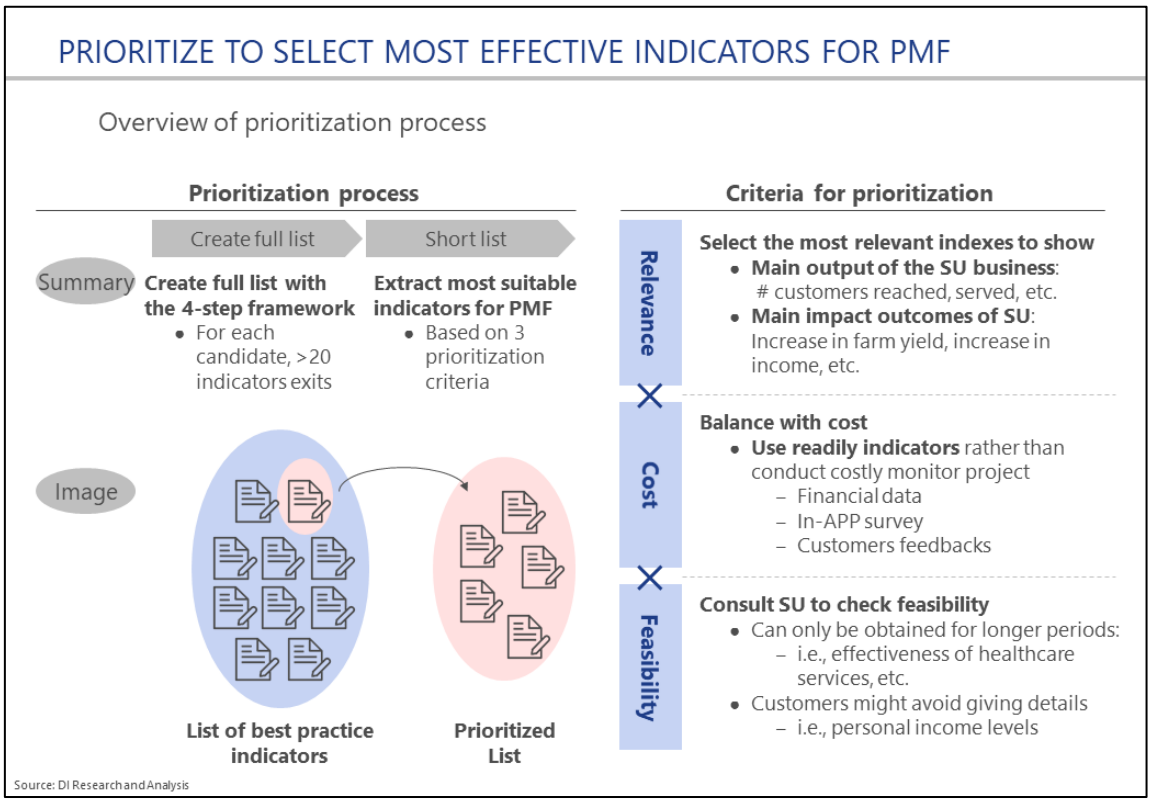
【Figure 5-3-4: Startup report template example】

In view of unmanaged fund state, the impact measurement of PMF target companies will be limited to the indicators used. As shown below, even for funds under management, the cost of impact measurement is commonly about 10%.



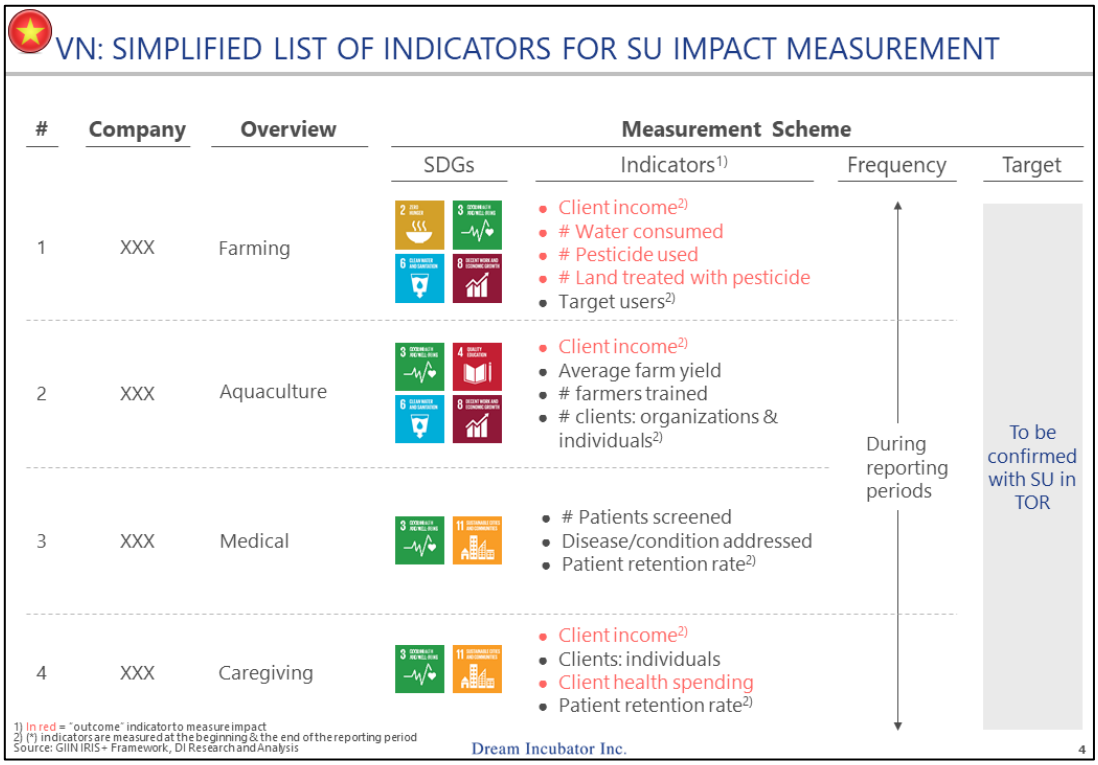
【Figure 5-3-5: Overview of costs for impact measurement】

As shown in the figure below, the selection process of impact measurement indicators to be employed for this project is set up to extract prioritized indicators from a pool of all indicators based on three standpoints.

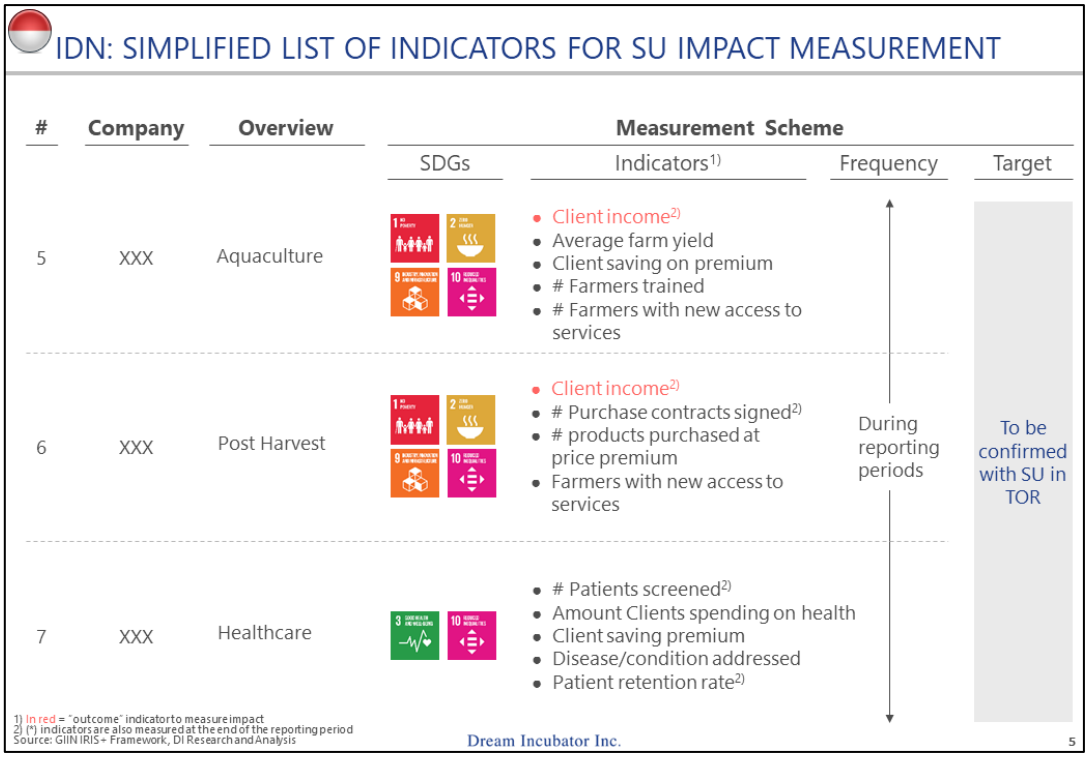


【Figure 5-3-6: Selection process of measurement indicators to be applied】

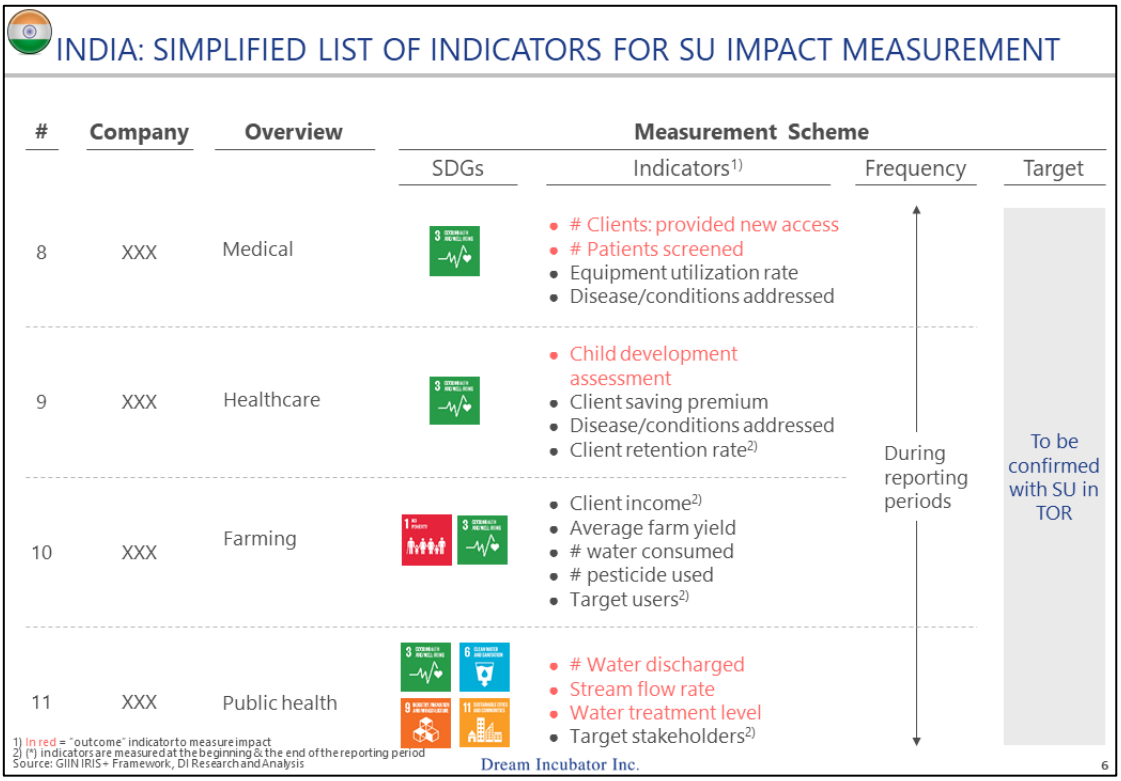
See below for examples (by country) of simple indicators for PMF candidates in each country.



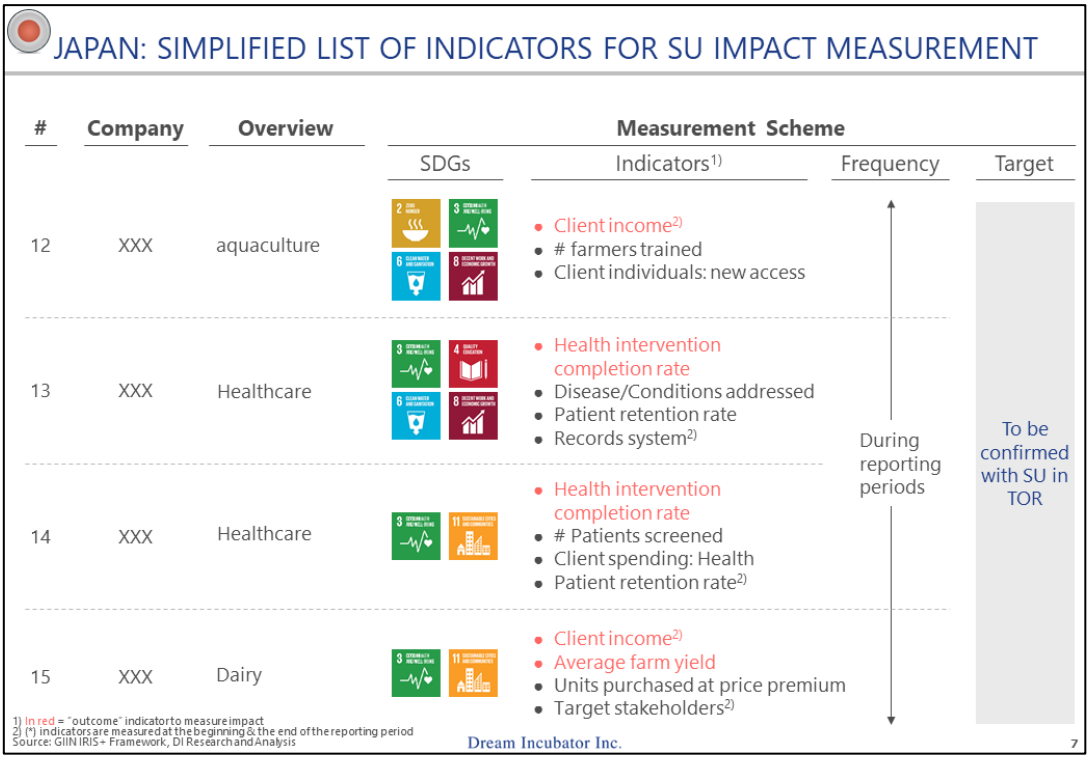
【Figure 5-3-7: Simple indicator for impact measurement (Vietnam)】



【Figure 5-3-8: Simple indicator for impact measurement (Indonesia)】



【Figure 5-3-9: Simple indicator for impact measurement (India)】



【Figure 5-3-10: Simple indicator for impact measurement (Japan)】

Appendix

A. Local startups list

Long List – Vietnam (1/6) : Public Health

Reference

Vertical	#	Company Name	Est. Year	Business Profile	Technology
Public health	1	LC Tech	2018	IoT smart Water meter for household	- IoT
	2	tmonitor	2019	Indoor air quality monitor and smart IoT for adjustment	- IoT - AI - Machine Learning
	3	Greenie	2019	Matching platform for trash management and recycle	- IoT - Machine learning
	4	GRAC	2019	Matching platform for trach collection and redeemption	- Matching platform - Machine learning
	5	Irecycle	2019	Collection of recyclable trash into points for shopping rewards	- Matching platform
	6	Buymed	2018	B2B ecommerce for pharmaceuticals distribution	- Matching platform - Ecommerce payment - Smart Logistics
	7	WeCare	2016	Maternal healthcare tracking app	- IoT - Machine learning - Big data
	8	upBeat	2018	Fitness challenge and lifestyle promotion app	- AI - IoT
	9	Revival Waste	2019	Direct classification of trash from source for appropriate recycle/repurpose	- IoT - Smart logistics

【Figure A-1: Vietnam startups list (1/6)】

Long List – Vietnam (2/6) : Agriculture-1

Reference

Vertical	#	Company Name	Est. Year	Business Profile	Technology
Agriculture	10	Foodmap.asia	2017	Farm-2-Table Ecommerce Platform - Directly sourcing from the farmers - Delivery to the consumers right after harvesting	- Blockchain technology for traceability - Coldchain
	11	Viet-Art	2019	Reuse waste woods from coffee-trees and farms to make eco-friendly and educational toys/ homeware	- Circular economy business model
	12	Ryan Technology	2017	IoT hardware and softwares for monitoring farming environment for rice/shrimps in Mekong Delta	- IoT technology - Machine Learning
	13	TepBac	2017	IoT hardware and softwares to monitor farming environment for shrimps/fish aquacutlure	- IoT technology - Machine learning - IP in IoT desgin and mechanical components
	14	MiSmart	2019	Smart drones for detecting rice/fruit trees healthiness and apply pesticides/insecticides	- Drones and UAV technology - Machine Learning - Image processing
	15	Tasa	2016	Nano and organic fertilizer	- Nano technology - Organic
	16	Cricket One	2017	Alternative protein powder and hamburger paste from crickets	- New farming technique - Biotech - Patented Processing technology
	17	Chopp	2017	Farm-2-table meal-kit ecommerce platform that promote safe eating	-Cold chain - Machine Learning

【Figure A-2: Vietnam startups list (2/6)】

Long List – Vietnam (3/6) : Agriculture-2

Reference

Vertical	#	Company Name	Est. Year	Business Profile	Technology
Agriculture	18	Far-Green	2015	Organic mushroom and honey contracted farming ecosystem	- Organic farming technology - Cold chain
	19	Latoi	2019	AI-assisted crop-disease diagnosis mobile app	- AI & machine learning
	20	toilathaomoc	2018	Alternative homeware chemicals using organic components from agricultral waste	- Organic farming - Bio fermentization
	21	LineUP	2019	High-quality dried protein powder from Veggies	- Biotech - Cold dry
	22	Nextfarm	2017	IoT Automatic fertilizer supply for horticulture and green house	- Green house - IoT - AI
	23	Hachi	2016	Hydropolic and IoT hydropolic system	-Hydropolic tech - IoT
	24	MimosaTEK	2016	IoT spraying and monitoring for farms	- IoT - AI
	25	MrVina	2018	IoT and farm management system for farms and green houses	- IoT - AI
	26	Appa Group	2018	Smart management system for farm	- IoT - AI
	27	AgriConnect	2018	Smart Mushroom factory	- IoT - AI - Bio-farming technique
	28	LanCS	2019	Automatic Aquaculture farm	-IoT - AI
	29	Hoa Man Vy	2020	Alternative cosmetics extract from wild flowers	- Biotech - Pharmaceuticals

【Figure A-3: Vietnam startups list (3/6)】

Long List – Vietnam (4/6) : Healthcare-1

Reference

Vertical	#	Company Name	Est. Year	Business Profile	Technology
Healthcare	30	DeepCare	2019	Chatbot to assist primary care	-Machine Learning - AI - Natural Language Processing
	31	Medici	2018	Telemedicin & integrated clinic appointment booking	- AI - Matching platform
	32	WeCare247	2017	Ecommerce platform and IoT tech for inpatient careworkers	- Matching platform - IoT
	33	Carrotta	2019	Matching platform for mental health screening, consultation booking	- Matching platform
	34	Doctor Bear	2019	Telemedicin ecosystem with pre-screening	- Matching platform - Machine learning - IoT
	35	Medigo	2019	B2C ecommerce for drugs and doctor consultation	- Matching platform - Machine Learning
	36	Papaya	2018	Health insurance digital app for corporate employee	- Matching platform
	37	Dr.OH	2018	Clinic booking and post-clinic monitor and pharmacy platform	- Matching platform
	38	VieVie Care	2017	Telemedicine and doctor consultation app	- Matching platform
	39	Med247	2017	O2O telemedicines and clinic system	- IoT - Matching plaform
	40	Medlink	2017	B2B matching platform for pharmacies and pharmaceutical companies	- Matching platform

【Figure A-4: Vietnam startups list (4/6)】

Long List – Vietnam (5/6) : Healthcare- 2

Reference

Vertical	#	Company Name	Est. Year	Business Profile	Technology
Healthcare	41	Vin Brain	2018	Image analysis in detecting lung cancer	- AI - Machine learning
	42	VMED Group	2015	Ecosystem and d/x transformation for hospitals	- IoT - ERP/BI
	43	Ecomedic	2016	Ecosystem and d/x transformation for hospitals	- IoT - ERP/BI
	44	FaCare	2018	PoC IoT ecosystem for seemless monitoring of health from hospitals to private clinics to homecare	- IoT - Matching platform
	45	webnhathuoc	2016	D/x transformation and management tool for pharmacies	- IoT - ERP/BI
	46	Onelink	2018	Smart management system for hospitals using contactless cards	-IoT
	47	Beestro	2018	Private clinics convenient booking ecosystem	- Matching platform
	48	Ligomed	2019	ERP for healthcare industry (Pharmeceutical, Hospitals, clinics, etc.)	- ERP/BI
	49	Medon	2019	Clinic booking and post-clinic monitor and pharmacy platform	- Matching platform - IoT
	50	Sphacy	2019	B2B2C matching platform to help consumers buy drugs from SME pharmacies	- Matching platform - Machine learning

【Figure A-5: Vietnam startups list (5/6)】

Long List – Vietnam (6/6) : Healthcare-3

Reference

Vertical	#	Company Name	Est. Year	Business Profile	Technology
Healthcare	51	iCare Pharma	2019	Alternative pharmaceuticals from natural ingredients	- Bio/pharmaceutical
	52	Oliu	2019	D/x transformation and management tool for hospitals	- ERP/BI
	53	OICNEW	2018	nano medicine and pharmaceutical-like products	- Nano technology - Organic
	54	NEXTFit	2019	Personal trainer and healthcare consultant booking app	- Matching platform - IoT
	55	Multi Vietnam	2019	IoT glasses with special function for short-sighted and disable people	- IoT
	56	Pupilometrics	2020	Smart consultation based on AI reading of pupils positioning	- AI - Machine learning
	57	Momtour	2019	Maternal heathcare tracking app	- IoT - Matching platform
	58	Oban	2019	Telemedicin app	- AI - Machine learning
	59	MedProve	2018	Patient profile ERP system	- Big data
	60	Finizz	2016	Info forum and matching platform for clinic booking	- Big data - Machine learning - Matching platform

【Figure A-6: Vietnam startups list (6/6)】

Long List – Indonesia (1/9) : Public Health - 1

Reference

Sector	#	Name of startup	Est Year	Business description	(2) Tech Application
Public health	1	Waste4Change	2014	Offers subscription service where customer pays for their trash to be picked up regularly for households, offers waste management solutions for companies	Digital
	2	Sampangan	2017	Invent Magic Box that transform waste into biofertilizer and biopesticide	Hardware
	3	Siklus Refill	2019	Allows purchase/refills of consumer goods such as oil, homecare products, and coffee in reusable containers	O2O
	4	Teman Bumil	2018	Pregnant mother and younger child health monitoring app	Digital
	5	Jamban.id	2019	Locating nearest clean public toilet, rejuvinate public toilet	Digital
	6	SIAB	2019	Monitor water quality and clean water distribution	IoT
	7	ReBlood	2015	Blood donor scheduling app and knowledge sharing	Digital
	8	Pasienia	2015	Platform for community to exchange knowledge regarding symptoms and motivate each other	Digital
	9	Babyologist	2017	Platform to support pregnancy and parenting journey	Digital
	10	Teman Diabetes	2016	Platform to exhange knowledge on how to prevent diabetes	Digital

【Figure A-7: Indonesia startups list (1/9)】

Long List – Indonesia (2/9) : Public Health - 2

Reference

Sector	#	Name of startup	Est Year	Business description	(2) Tech Application
Public health	11	Moretrash	2018	Offers subscription service where customer pays for their trash to be picked up regularly for households, offers waste management solutions for companies	Digital
	12	Bulk Source	2019	Allows purchase/refills of consumer goods such as oil, homecare products, and coffee in reusable containers	O2O
	13	Gringgo	2014	Trash pick up subscription to households, eco-training/consulting/waste management solutions for business	IoT
	14	MallSampah	2015	Linking household and garbage collector, and marketplace for recycled products	Digital
	15	Scrapiro	2019	Track Scrap from its creation and get it to be recycled	Digital
	16	Sampahmuda	2016	Trash pick up subscription	Digital
	17	Angkuts	2016	Trash pick up subscription	Digital
	18	SMASH	2016	Trash pick up subscription	Digital
	19	Jangjo	2019	Waste management solutions and encouraging community awareness of reduce, reuse, recycle	Digital
	20	Mulung	2018	Converting trash into points that can be exchanged with credits	Digital

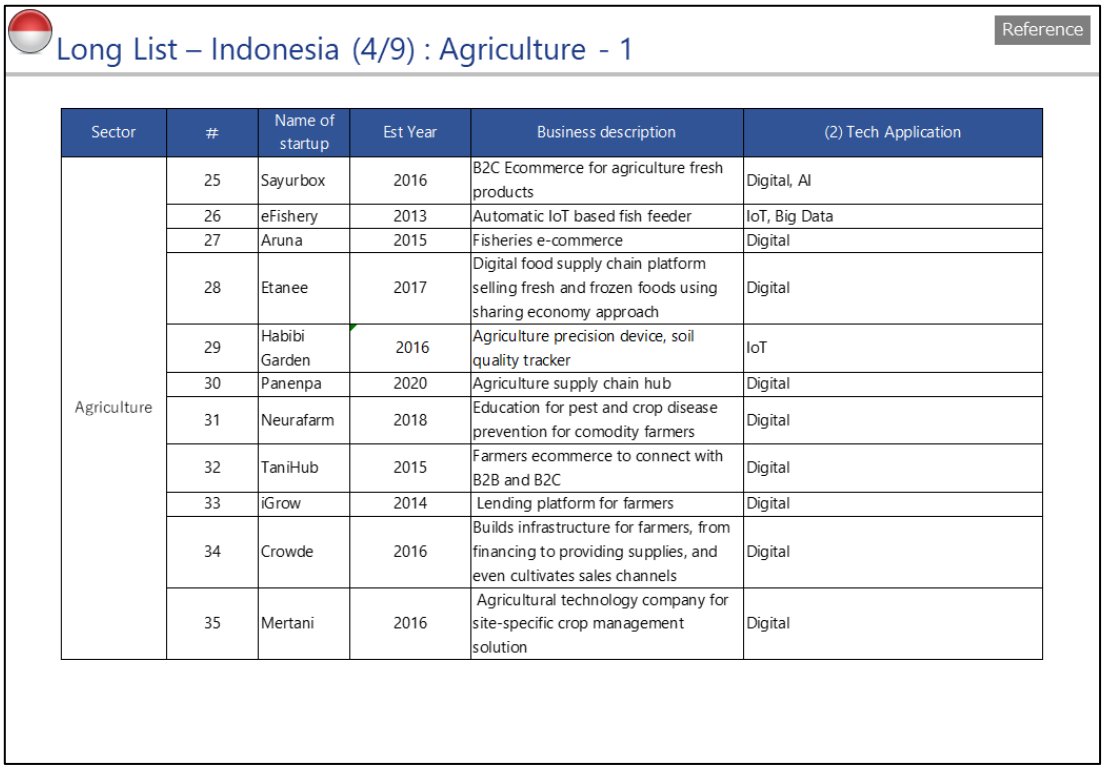
【Figure A-8: Indonesia startups list (2/9)】

Long List – Indonesia (3/9) : Public Health - 3

Reference

Sector	#	Name of startup	Est Year	Business description	(2) Tech Application
Public health	21	DamoGO	2018	Re-selling unsold food in a cheaper price	Digital
	22	Surplus	2020	Re-selling unsold food in a cheaper price	Digital
	23	Lemonilo	2015	E-commerce of healthy food and cosmetics	Digital
	24	Bell Society	2017	Transforming plant waste into useful products	Bio-tech

【Figure A-9: Indonesia startups list (3/9)】

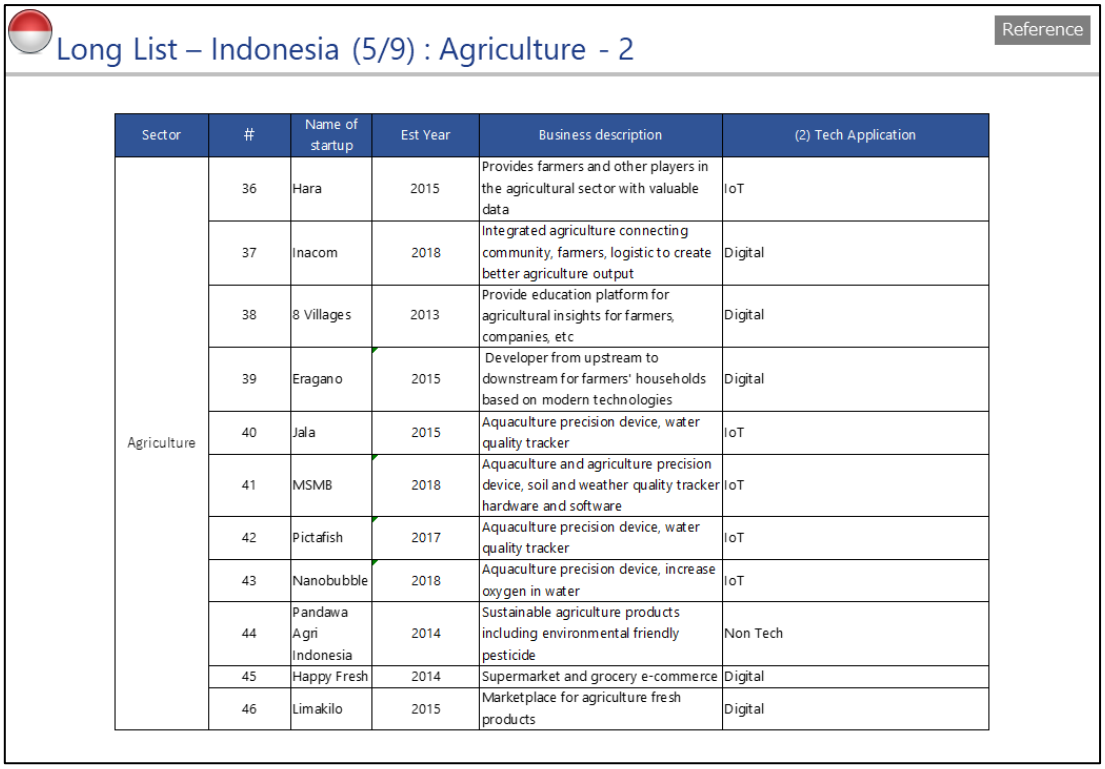


Long List – Indonesia (4/9) : Agriculture - 1

Reference

Sector	#	Name of startup	Est Year	Business description	(2) Tech Application
Agriculture	25	Sayurbox	2016	B2C Ecommerce for agriculture fresh products	Digital, AI
	26	eFishery	2013	Automatic IoT based fish feeder	IoT, Big Data
	27	Aruna	2015	Fisheries e-commerce	Digital
	28	Etanee	2017	Digital food supply chain platform selling fresh and frozen foods using sharing economy approach	Digital
	29	Habibi Garden	2016	Agriculture precision device, soil quality tracker	IoT
	30	Panenpa	2020	Agriculture supply chain hub	Digital
	31	Neurafarm	2018	Education for pest and crop disease prevention for comodity farmers	Digital
	32	TaniHub	2015	Farmers ecommerce to connect with B2B and B2C	Digital
	33	iGrow	2014	Lending platform for farmers	Digital
	34	Crowde	2016	Builds infrastructure for farmers, from financing to providing supplies, and even cultivates sales channels	Digital
	35	Mertani	2016	Agricultural technology company for site-specific crop management solution	Digital

【Figure A-10: Indonesia startups list (4/9)】



Long List – Indonesia (5/9) : Agriculture - 2

Reference

Sector	#	Name of startup	Est Year	Business description	(2) Tech Application
Agriculture	36	Hara	2015	Provides farmers and other players in the agricultural sector with valuable data	IoT
	37	Inacom	2018	Integrated agriculture connecting community, farmers, logistic to create better agriculture output	Digital
	38	8 Villages	2013	Provide education platform for agricultural insights for farmers, companies, etc	Digital
	39	Eragano	2015	Developer from upstream to downstream for farmers' households based on modern technologies	Digital
	40	Jala	2015	Aquaculture precision device, water quality tracker	IoT
	41	MSMB	2018	Aquaculture and agriculture precision device, soil and weather quality tracker hardware and software	IoT
	42	Pictafish	2017	Aquaculture precision device, water quality tracker	IoT
	43	Nanobubble	2018	Aquaculture precision device, increase oxygen in water	IoT
	44	Pandawa Agri Indonesia	2014	Sustainable agriculture products including environmental friendly pesticide	Non Tech
	45	Happy Fresh	2014	Supermarket and grocery e-commerce	Digital
	46	Limakilo	2015	Marketplace for agriculture fresh products	Digital

【Figure A-11: Indonesia startups list (5/9)】

Long List – Indonesia (6/9) : Agriculture - 3

Reference

Sector	#	Name of startup	Est Year	Business description	(2) Tech Application
Agriculture	47	Chilibeli	2019	Fresh produce and basic needs ecommerce	Digital
	48	Kedai Sayur	2016	Fresh produce e-commerce	Digital
	49	Eden Farm Indonesia	2017	fresh produce and basic needs e commerce	Digital
	50	Sikumis.com	2014	Fresh produce and basic needs ecommerce	Digital
	51	Kecipir	2015	Organic/Natural farm product and distribution	Digital
	52	Teman Pasar	2020	Marketplace for agriculture fresh products in traditional market	Digital
	53	Agrisia	2017	End-to-end agricultural solutions to vegetable stores	Digital

【Figure A-12: Indonesia startups list (6/9)】

Long List – Indonesia (7/9) : Healthcare - 1

Reference

Sector	#	Name of startup	Est Year	Business description	(2) Tech Application
Healthcare	54	Prixa.ai	2019	Healthcare gateway for patients to providers & payors, using NLP diagnosis	Digital, AI
	55	Klinik Pintar	2019	Building a digital ecosystem to make Indonesian healthcare better for everyone.	Digital
	56	Reach52	2017	Digitization process of medical records and consultation	Digital, O2O
	57	ctscope	2019	Digitization process of medical records to connect medical players	Blockchain
	58	Halodoc	2016	Halodoc is a health-tech platform that connects patients with doctors, insurance, labs, and pharmacies in one simple mobile application.	Digital
	59	Alodokter	2014	Alodokter.com is a leading health portal in Indonesia providing high quality content and interaction with qualified Indonesian doctors	Digital
	60	eClinic	2017	Hospital management software	Cloud-Based
	61	Medico	2004	Medico is a hospital management software	Cloud-Based
	62	Zi.Care	2018	Hospital administration, EMR, insurance claim management system	Digital
	63	Walking Doctor	2018	Digitize health medical record for more accuracy diagnosys	Digital
	64	TeleCTG	2016	A simplified cardiotocography (CTG) device that provides cost-effective, portable, and real-time data capturing.	Hardware
	65	Neurabot	2018	AI based digital laboratory	Digital

【Figure A-13: Indonesia startups list (7/9)】

Long List – Indonesia (8/9) : Healthcare - 2

Reference

Sector	#	Name of startup	Est Year	Business description	(2) Tech Application
Healthcare	66	ProSehat	2015	Online platform where users can request doctor and buy OTC and prescription drugs	Digital
	67	Konsula	2015	Online doctor directory listing doctor's phone number for booking	Digital
	68	Doktersehat	2015	Doctor directory and online booking	Digital
	69	Lokadok	2015	Doctor directory and online booking	Digital
	70	PesanLab	2015	Platform to order Blood Testing and Medical Checkup	Digital
	71	SehatQ	2018	Integrated health platform connecting patients to pharmacies, doctor, hostpital	Digital
	72	Klikdokter	2008	Healthtech platform provides online consultation, articles, etc	Digital
	73	Honestdoc.id	2013	Honestdoc is a health and wellness site that provide diseases, medicine, hospital, pharmacy informations, doctor will answer question 24-48 hrs	Digital
	74	Dokter.id	2013	Online portal and forum for health discussion	Digital
	75	Tanyadok	2015	Online doctor consultation and portal	Digital
	76	Perawatku	2016	Online learning and job portals for healthcare professional	Digital
	77	Good Doctor	2019	All-in-one healthcare servicing platform	Digital

【Figure A-14: Indonesia startups list (8/9)】

Long List – Indonesia (9/9) : Healthcare - 3

Reference

Sector	#	Name of startup	Est Year	Business description	(2) Tech Application
Healthcare	78	NalaGenetics	2016	Genetics testing kits for diagnosis	Deep-tech
	79	Nusantics	2019	Analyze skin microbiome profiles using bio-technology	Bio-tech
	80	Farmaku	2017	Ecommerce providing various pharmaceutical products	Digital
	81	Goapotik	2016	Ecommerce providing various pharmaceutical products	Digital
	82	Wecare.id	2015	Fundraising platform for medical condition	Digital

【Figure A-15: Indonesia startups list (9/9)】

Long List – India (1/3) : Public Health

Reference

No.	Company name	Business	Founded	HQ
1	HealthCubed	Patient management & diagnostic tool	2015	BethesdaBangalore
2	Pathshodh Healthcare	Provider of devices for analysis of small volumes of blood.	2015	Bangalore
3	Pulse Active Stations Netw	Developer of connected network of IOT-based smart kiosks	2016	Hyderabad
4	Morphle	Whole slide scanner based telepathology platform	2017	Bangalore
5	Cyclops MedTech	Provider of VR based eye tracking solution for eye balancing and testing	2015	Bangalore
6	Cure Skin	AI driven app for automated diagnosis of skin conditions	2016	Bangalore
7	Theranosis	Provider of liquid biopsy solutions for cancer	2016	Hyderabad
8	Adiuvo Diagnostics	POC devices for use in low resource settings	2015	Nellore
9	Yostra	Developer of medical devices for diabetes and intravenous therapy	2015	Bangalore
10	Orbuculum	AI based solutions for disease prediction	2017	Chennai
11	Cardiotrack	AI-based capture and analysis of EGC data	2014	Bangalore
12	Azooka Life Sciences	Nucleic-acid fluorescent strains for molecular diagnostics and other genomic applications	2015	Bangalore
13	Brisil Technologies	Technology to produce precipitated silica from rice husk ash	2016	Vadodara
14	Fluid Robotics	Provider of pipeline monitoring & underwater monitoring solutions	2016	Pune
15	Skilancer Solar	Provider of automated cleaning systems for solar panels	2017	Noida
16	Ambee	Portable pocket device and air purifier for monitoring air pollution	2016	Bangalore
17	Cell Propulsion	Developer of power conversion kits	2016	Bangalore
18	Faclon	Provider of an IoT analytics smart cities platform for water management	2015	Mumbai
19	SustLabs	Home energy consumption monitoring solution provider	2016	Mumbai
20	Elicius	Provider of solutions for hydrogen fuel cells	2018	Chennai

【Figure A-16: India startups list (1/3)】

Long List – India (2/3) : Agriculture

Reference

No.	Company name	Business	Founded	HQ
21	TartanSense	Analyzing health of plants using drones	2015	Bangalore
22	Wolkus Technology Solutio	AI-powered IoT platform for precision agriculture	2018	Bangalore
23	BharatAgri	Platform that provides crop management solutions for farmers	2017	Pune
24	Coastal Aquaculture Resea	Develops and offers aquaculture management system	2017	Chennai
25	Agricx	Provider of AI-based stack solutions	2016	Thane
26	Eggoz	Full-stack egg producer using advanced technology. IoT based poultry farming techniques	2017	Bihar Sharif
27	FarMart	Web and mobile-based application for renting farm equipment	2015	Gurgaon
28	PayAgri	Online platform to bring cashless ecosystem in Agriculture	2017	Chennai
29	UrbanKisaan	Online platform offering food ingredients based on subscription	2017	Hyderabad
30	Aggois	Platform providing agriculture financial solutions	2017	Bangalore
31	Marut Drones	Provides drone-based precision agriculture services	2019	Guwahati
32	NubeSol	Sensor based technology solutions for sugarcane farming in India	2015	Bangalore
33	KrishiHub	Online platform for B2B sales fo vegetables	2016	Bangalore
34	Bharat Rohan	Data capturing, analytic and advisory services for farmers in India	2015	Delhi
35	easykrishi	Mobile software platform that connects small-scale suppliers with agricultural bulk buyers	2016	Bangalore
36	SmartFarms	Online B2B distributor of agricultural input products	2019	Gurgaon
37	Agro2o	Manufacturer and supplier of indoor hydroponics system	2017	Delhi
38	Kheyti	Greenhouse and end-to-end farm enabling services	2015	Hyderabad
39	Occipital Tech	Provider of automated grading and sorting solutions	2017	Mumbai
40	Brainwired	Livestock health monitoring and tracking solution	2018	Kochi

【Figure A-17: India startups list (2/3)】

Long List – India (3/3) : Healthcare

Reference

No.	Company name	Business	Founded	HQ
41	I3Systems	Artificial Intelligence for Business decision making in Healthcare	2016	Mumbai
42	Bionic Yantra	Provider of exoskeleton for mobility and rehabilitation	2017	Bangalore
43	iNICU	Cloud based workflow automation solution for Neonatal ICU	2016	Delhi
44	ArtiVatic	AI-based insurtech platform for insurance brokers & health businesses	2017	Bangalore
45	TerraBlue XT	Provider of smart glove for detecting and predicting seizures	2015	Bangalore
46	Predible Health	Deep Leaning startup to help physicians with data-driven clinical insights	2015	Bangalore
47	Prognostics In-Med	Provider of brain health diagnostic tool	2016	Pune
48	Arcatron Mobility	Provider of patient friendly wheel chair provider	2015	Pune
49	Thinkerbell	Hardware and software solutions for Braille-based education	2016	Bangalore
50	Synapsica	Developer of teleradiology services	2018	Delhi
51	Algosurg	Technology solution for surgeries using advanced computing methods, enhanced visualisation and automation	2016	Mumbai
52	Docturnal	Offer an app for AI-based non-invasive detection of tuberculosis	2016	Hyderabad
53	Nemo Care	Wearable device for monitoring infants	2017	Hyderabad
54	Endimension Technology	Provider of platform for diagnostic imaging solutions	2017	Mumbai
55	ClinMD	Provides a platform ingests data from various healthcare providers and helps with insights	2017	Jaipur
56	Curneu	Provider of digital health solutions for clinical practices	2017	Chennai
57	Ayata Intelligence	Smart eyewear with bone conduction speakers for visually differently-abled	2016	Bangalore
58	Spotsense	Non-invasive diagnostic solutions for neonatal sepsis	2016	Bangalore
59	Zoelr	IoT-based Healthcare device startup	2016	Delhi
60	Farmako	Blockchain technology provider for storing health records	2019	Roorkee

【Figure A-18: India startups list (3/3)】

B. Japanese startups list

POTENTIAL JAPANESE STARTUP LONGLIST (1/3)

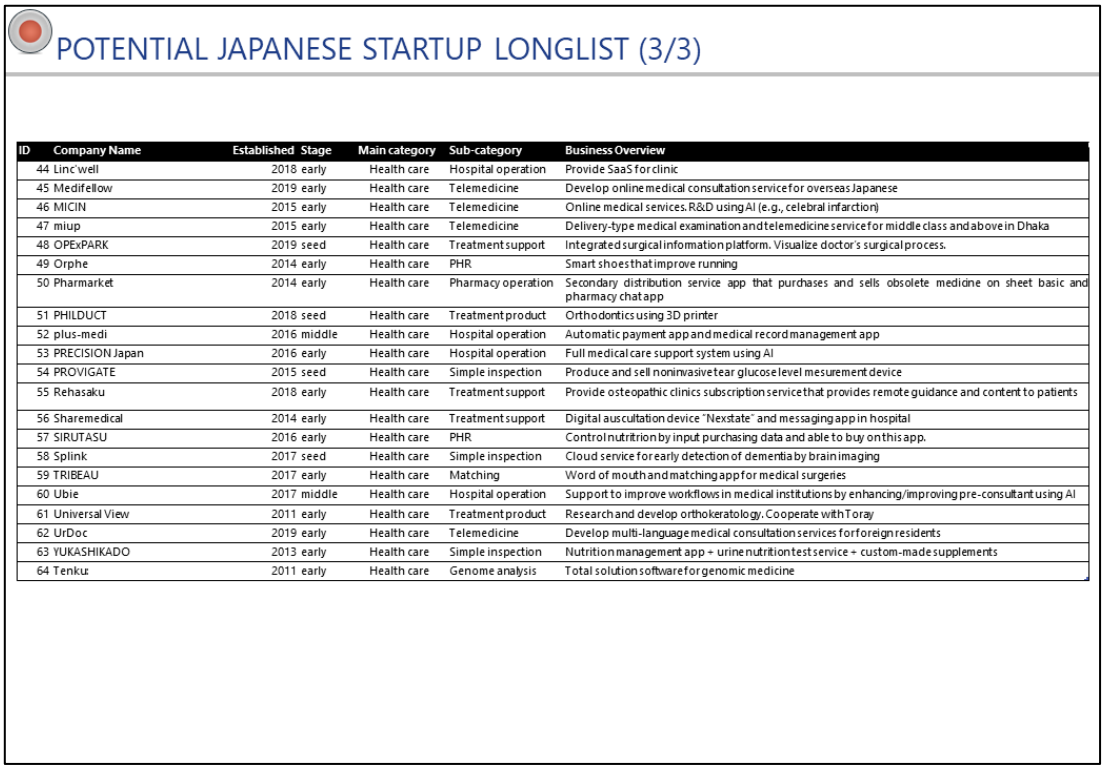
ID	Company Name	Established	Stage	Main category	Sub-category	Business Overview
1	DESAMIS	2016	early	Agri	Livestock	Develop cattle behavior monitoring system "U-motion?". Detect silent voice of cattle by collecting and analyzing behavior data to increase productivity.
2	inaho	2017	early	Agri	Agri machine	Develop robot havesting vegetables automatically using AI.
3	Momo	2016	early	Agri	Climate control	Visualize farm condition on Android tablet/smartphone from data collected by sensors (i.e., temperature / humidity / sunshine / soil temperature & moisture.
4	OSMIC	2015	early	Agri	Soil improvement	Cultivate tomatoes on soil that are high-density micro organisms. Aim to be a plant factory using climate control system.
5	PLANT DATA	2014	seed	Agri	Climate control	Measure and analyze plant biological information, and provide services related to that info. application.
6	PLANTS LABORATORY	2014	seed	Agri	Climate control	Operate plant factory jointly developed by University of Tokyo.
7	PLANTX	2014	early	Agri	Climate control	Develop the world's first enclosed-type plant cultivation device. Each cultivation shelf is sealed inde-pendently and controlled precisely by air conditioning & nutrient solution circulation system inside.
8	SECAI MARCHE	2018	early	Agri	Distribution	Build a platform that producers in Malaysia and Japan can trade by B2B directly.
9	sensprout	2015	early	Agri	Climate control	Gadget that uses sensors to monitor soil's moisture.
10	vegitalia	2010	early	Agri	Climate control	Remote environment measurement system. Experienced management team.
11	Agri Flyer	2010	early	Agri	Control	Develop drones for crop spraying.
12	Agro Design Studio	2018	seed	Agri	Control	Same as pharmaceutical industry, from startup's perspective, there are 6 pipelines for pesticides development.
13	Eco-Pork	2017	early	Agri	Livestock	Provide pig farming support system "Porker".
14	Ginza Farm	2007	early	Agri	Climate control	Combine smart agriculture technology with high-yielding varieties to produce ultra-low-cost export rice that earns the same income as main food rice. Also handle remote sensing of fruit trees and robots.
15	Gragreen	2017	seed	Agri	Seed/Raising seedling	Target to create innovation in crop seedling by grafting technology.
16	Green River Holdings	2014	early	Agri	Climate control	Plant factory operation.
17	Skymatix	2016	early	Agri	Quality control	Brown rice grading by using smartphone photos. Provide image analysis service in agriculture sector, such as leaf color analysis using drone-photographed images.
18	Nileworks	2015	early	Agri	Control	Provide rice farmers with agricultural drones and cloud services for growth diagnostics. Centimeters-based automatic flight can spray chemicals at a close range and detect the growth status of each strain.
19	Japan Agri	2016	early	Agri	Other	Export Japan agriculture products (e.g, apples) to Southeast Asia.
20	Farmship	2014	early	Agri	Climate control	Have 3 businesses: "plant factory", "agricultural product distribution" & "agricultural data science". Operate plant factory in Indonesia.
21	Farmnote Holdings	2016	early	Agri	Livestock	Provide herd management system "Farmnote" on cloud & wearable device for cattle "Farmnote Color".
22	Planet Table	2014	later	Agri	Distribution	Distribution support platform for restaurants from production areas.
23	Musca	2016	seed	Agri	Soil improvement	Highly efficient biomass recycling system technology that utilizes housefly larvae. Process fertilization (e.g, manure) in 1 week, instead of the normal 3 to 4-week time. Convert dead housefly larvae which is used for fertilization to protein-rich feed.

【Figure B-1: Japanese startup longlist (1/3)】

POTENTIAL JAPANESE STARTUP LONGLIST (2/3)

ID	Company Name	Established	Stage	Main category	Sub-category	Business Overview
24	Regional Fish	2019	early	Agri	Fisheries	Breeding marine products and smart aquaculture.
25	Routrek	2005	middle	Agri	Climate control	Develop autonomous fertigation system contributing to "high yield, high quality, labor-saving" by automating irrigation and fertilization with IoT and AI technologies.
26	Legmin	2018	seed	Agri	Agri machine	A robot that fully automates the whole process from sowing leafy vegetables to spraying pesticides and fertilizers and harvesting.
27	Enowa	2013	early	Agri	Climate control	Provide water level adjustment service for wetland rice farmers live in Toyama. Already installed in 490 locations in the whole country as of Nov 2020. Raised JPY 100M in Series A funding last month. Accumulated JPY 170M.
28	Aillis	2017	seed	Health care	Image diagnostic	Influenza test method for high accuracy and early diagnosis using AI.
29	AuB	2015	early	Health care	Simple inspection	Intestinal environment inspection service.
30	bitBiome	2018	seed	Health care	Genome analysis	Analyze the whole genome of unknown microbiome from a single cell.
31	Care Design Institute	2017	early	Health care	Treatment support	Develop care plan using AI.
32	ClinCloud	2014	early	Health care	Research support	Provide cloud solution for clinical trial information collection.
33	Cloud Clinic Japan	2015	early	Health care	Hospital operation	Provide home medical care outsourcing service.
34	CUC	2019	early	Health care	PHR	Prevent and improve health conditions of patients with lifestyle diseases (e.g., diabetes) by PHR app. Easy to launch as having local hospital. M3 subsidiaries.
35	CureApp	2014	middle	Health care	Treatment support	Provide digital treatment app.
36	Deltan	2019	early	Health care	Treatment product	Custom-made orthodontic service.
37	Doctors Me	2015	middle	Health care	Telemedicine	Chat based inquiry service. Operated by media marketing company.
38	iCARE	2011	middle	Health care	Health management	Health care management app. Large number of installations.
39	iMed Technologies	2019	seed	Health care	Treatment support	Real time surgery support AI for neurovascular surgery.
40	Integrity Healthcare Japan	2009	early	Health care	Research support	Online medical care system/disease management system YaDoc.
41	Kompath	2015	early	Health care	Treatment support	Provide 3D atlas for learning and education, targeting medical professionals.
42	Iafool	2011	early	Health care	Health management	Mental health system. Corporate employee management.
43	Life&Tail	2011	early	Health care	Others	Provide seminars and teaching materials for veterinarian.

【Figure B-2: Japanese startup longlist (2/3)】



POTENTIAL JAPANESE STARTUP LONGLIST (3/3)

ID	Company Name	Established	Stage	Main category	Sub-category	Business Overview
44	Linc'well	2018	early	Health care	Hospital operation	Provide SaaS for clinic
45	Medifellow	2019	early	Health care	Telemedicine	Develop online medical consultation service for overseas Japanese
46	MICIN	2015	early	Health care	Telemedicine	Online medical services. R&D using AI (e.g., celebral infarction)
47	miup	2015	early	Health care	Telemedicine	Delivery-type medical examination and telemedicine service for middle class and above in Dhaka
48	OPExPARK	2019	seed	Health care	Treatment support	Integrated surgical information platform. Visualize doctor's surgical process.
49	Orphe	2014	early	Health care	PHR	Smart shoes that improve running
50	Pharmarket	2014	early	Health care	Pharmacy operation	Secondary distribution service app that purchases and sells obsolete medicine on sheet basic and pharmacy chat app
51	PHILDUCT	2018	seed	Health care	Treatment product	Orthodontics using 3D printer
52	plus-medi	2016	middle	Health care	Hospital operation	Automatic payment app and medical record management app
53	PRECISION Japan	2016	early	Health care	Hospital operation	Full medical care support system using AI
54	PROVIGATE	2015	seed	Health care	Simple inspection	Produce and sell noninvasive tear glucose level mesurement device
55	Rehasaku	2018	early	Health care	Treatment support	Provide osteopathic clinics subscription service that provides remote guidance and content to patients
56	Sharemedical	2014	early	Health care	Treatment support	Digital auscultation device "Nexstate" and messaging app in hospital
57	SIRUTASU	2016	early	Health care	PHR	Control nutritrion by input purchasing data and able to buy on this app.
58	Splink	2017	seed	Health care	Simple inspection	Cloud service for early detection of dementia by brain imaging
59	TRIBEAU	2017	early	Health care	Matching	Word of mouth and matching app for medical surgeries
60	Ubie	2017	middle	Health care	Hospital operation	Support to improve workflows in medical institutions by enhancing/improving pre-consultant using AI
61	Universal View	2011	early	Health care	Treatment product	Research and develop orthokeratology. Cooperate with Toray
62	UrDoc	2019	early	Health care	Telemedicine	Develop multi-language medical consultation services for foreign residents
63	YUKASHIKADO	2013	early	Health care	Simple inspection	Nutrition management app + urine nutrition test service + custom-made supplements
64	Tenkuu	2011	early	Health care	Genome analysis	Total solution software for genomic medicine

【Figure B-3: Japanese startup longlist (3/3)】

C. Japanese tech-company list

BUSINESS/PROPRIETARY TECHNOLOGY OF 61 SELECTED COMPANIES

Category and Theme		Company Name (In chronological order of extraction)	Business/Technology overview
Agri	Crop distribution	Techno Soft Co., Ltd.	Reduce food loss by matching supply and demand through re-designing the food distribution promotion business system for fresh food near expiration date.
Agri	Crop distribution	Mayekawa Mfg. Co., Ltd.	As the company already have had capability to design and make food-related equipment, it is expected to be able to design and make a receiving-matching system including hardware.
Agri	Crop distribution	Chiyoda Electronics Co., Ltd	Non-destructive sugar content/maturity meter using near-infrared light can be used to determine harvest time, quality control of exported products, DX of product management, confirmation of storage conditions, etc.
Agri	Crop distribution	Intelligent Technology Inc.	The handy taste sensor is a unique technology. Even though non-destructive testing is impossible, this technology can be used for quality control of exported products by samples and product control DX.
Agri	Crop distribution	BLANCTEC INTERNATIONAL Co., Ltd.	Inhibit bacteria growth and resolve enzymes activities to extend freshness-keeping period by using an ice machine that can freeze high-concentration salt water instantly and control ice condition.
Agri	Crop distribution	Shinshu Ceramics Co., Ltd	Antibacterial materials that use ceramic composite functional materials can exert antibacterial effects even in the dark and extend shelf life of fresh foods through antibacterial activities (e.g., in warehouse).
Agri	Crop distribution	OMIYA KOATSU LTD	Food bacteriostatic technology that immerse food in NaClO solution to extend the fresh food's shell life and prevent food poisoning.
Agri	Crop distribution	Sankei Inc.	"Chlorous acid water" that has chemically stable bactericidal power and disinfecting/deodorizing effects can extend the shelf life of fresh food including meat.
Agri	Smart Agri	SkymatiX, Inc.	Provide remote sensing solutions that combine artificial intelligence, image data processing, and geographic information system using drones.
Agri	Smart Agri	Drone Japan Inc.	Collect various sensor and image data through drone automatic operation and provide cultivation report by using cloud AI analysis.
Agri	Smart Agri	SEC Co., Ltd	WeatherBucket® is a compact multifunctional meteorological observation system. It can be used to collect measurement data wirelessly because it's easy to install and portable.
Agri	Smart Agri	Agriweather Inc.	Develop agricultural-related meteorological analysis and prediction software besides the multifunctional meteorological observation system WeatherBucket®.
Agri	Smart Agri	Watanabe Pipe Co., Ltd	Hydroponic farming system using control system, seed chips, and a seeding machine to improve work efficiency, save labor and increase the quality and yield of fruit vegetables
Agri	Smart Agri	Nileworks Inc.	Just by registering figure of the field, flight route is automatically generated and flight is fully automatic from takeoff to landing. Achieve automatic chemical spraying and homogeneous spraying by high precision flight

【Figure C-1: Japanese technology company longlist (1/5)】

BUSINESS/PROPRIETARY TECHNOLOGY OF 61 SELECTED COMPANIES

Category and Theme		Company Name (In chronological order of extraction)	Business/Technology overview
Agri	Smart Agri	BBB Japan Inc.	Produce organic fertilizer and aquaculture feed from livestock waste using domesticated houseflies zoocompost.
Agri	Smart Agri	Japan Conservation Engineers Co., Ltd	Use waste such as wood waste and steel slag as soil enrichment materials to promote plant's mineral absorption by agglomerating soil and stabilizing pH.
Agri	Smart Agri	TBA Co., Ltd	A test kit that enables definite diagnosis of multiple types of shrimp infections suspected by image analysis. Simply add shrimp body fluid and meat, amplify the genes, and then soak the test strip.
Agri	Smart Agri	Hibot Inc.	Underwater robot that can move inside the tank even if there are obstacles, remove desease suspected shrimp by image analysis or take images for diagnosis.
Agri	Farmer Finance	E-supportlink ltd.	Provide a system specializing in fresh food distribution on cloud, create an online supply chain that manage distribution information between multiple companies and departments.
Agri	Farmer Finance	Eco-Pork Inc.	Porker is a pig farming management system for farmers and vets. It collects data through operating mobile terminal to improve operations as well as optimize management.
Medical	Diagnosis and treatment quality improvement	A&T Corporation	The infection control support system CLINICIAN IC-3 provides useful information for infection control in real time, improves information sharing among staff and prompt infection control.
Medical	Diagnosis and treatment quality improvement	Allm Inc.	Non-contact vital sign measurement technology using the smartphone camera installed in the lifesaving/health support app can be used not only for adults but also for babies.
Medical	Hospital operation efficiency improvement	I-Tech Corporation	A system that can perform everything from appointments to payments on smartphones is expected to be in high demand in developing countries where payments are required for each medical examination department.
Medical	Hospital operation efficiency improvement	CYBERDYNE Omni Networks Inc.	The solution that detects vital signs and implantation with a sensor pad installed under the bed mat can be used not only for adults but also for babies.
Medical	Hospital operation efficiency improvement	Liquid Design Systems, Inc.	The air pad laid under the futon detects heart rate, respiratory rate, and body movement of infants, can be remotely monitored through smartphone app.
Medical	Telemedicine	AMI Inc.	Perform remote auscultation, which was difficult until now, by utilizing technology that sends heart sounds separately to audible and visible data.
Public Health	Prevention/Healthy Living	Good cycle system Inc.	Support pharmacies and pharmacists by an electronic drug history system and patients with follow-up after medication and payment via smartphones.
Agri	Smart Agri	Todakogyo Corp.	Develop technology that can decompose or insolubilize harmful substances contained in soil and groundwater efficiently, continuously and economically.

【Figure C-2: Japanese technology company longlist (2/5)】

BUSINESS/PROPRIETARY TECHNOLOGY OF 61 SELECTED COMPANIES

Category and Theme		Company Name (In chronological order of extraction)	Business/Technology overview
Agri	Smart Agri	Mastuda Giken Kougyou Inc.	Develop technology that can solidify harmful substances in contaminated soil (e.g., soil has heavy metals)
Agri	Smart Agri	Nikko Inc.	Develop a purification device containing volatile organic compounds that can purify contaminated soil easily.
Agri	Smart Agri	Japan Eco-science Co.,Ltd.	Provide thermophilic inoculum with environmental purification ability that impact positively on ecosystem.
Agri	Smart Agri	Mayekawa Inc.	As the company already have had capability to design and make food-related equipment, it is expected to be able to design and make a receiving-matching system including hardware.
Agri	Smart Agri	OPTim Corporation	Provide a wearable terminal that displays the estimated harvest time of agricultural products using AR.
Agri	Smart Agri	Kitaoka	Estimate the fertilizer amount that plants will need in the future from historical meteorological data and adjust the fertilizer amount based on that estimation.
Medical	Diagnosis and treatment quality improvement	Active Operations JSC	Develop a system that allows you to have suitable prescription based on blood tests and medical examinations at many locations such as drug stores and community halls.
Medical	Diagnosis and treatment quality improvement	Sharemedical Inc.	Innovate on the existing stethoscope to improve hearing of heart and breath sounds. Research & commercialize a digital auscultation device called "Nexstelo", which can amplify the volume and connect to headphones & speakers wirelessly.
Medical	Diagnosis and treatment quality improvement	KOBO SERA	Develop a game-like rehabilitation device to improve contractures that make joints stiff by spontaneously repeating flexion and extension of the legs or hands.
Medical	Diagnosis and treatment quality improvement	Instalimb Inc.	Produce cheap artificial limb by full 3D printing to the handicapped in developing countries (Philippines) who couldn't afford before. Each costs JPY 40,000, which is 1/10 the price of a conventional one.
Medical	Hospital operation efficiency improvement	Honest Inc.	Develop a technology to aggregate all inspection results executed by each inspection device on an electronic medical record server.
Medical	Hospital operation efficiency improvement	FINDEX Inc.	Develop a system to ensure correction of digitized questionnaires & patient information and content authenticity
Medical	Hospital operation efficiency improvement	SIOS Inc	Develop a system to calculate appointment time and arrange medical examination order based on priority and patient's input information.
Medical	Hospital operation efficiency improvement	Oki Electric Industry Co., Ltd	Develop a credit card integrated with medical examination card and peripheral system to determine the treatment policy based on the bank balance, usage history, and insurance coverage.

【Figure C-3: Japanese technology company longlist (3/5)】

BUSINESS/PROPRIETARY TECHNOLOGY OF 61 SELECTED COMPANIES

Category and Theme		Company Name (In chronological order of extraction)	Business/Technology overview
Medical	Hospital operation efficiency improvement	Recruit Holdings Co., Ltd.	Develop a management system to manage waiting numbers at many facilities.
Medical	Telemedicine	Toy Factory International Co., Ltd.	Manufacture and sell high-standard special car and spare parts to domestic and overseas markets. The company has already exported medical patrol cars equipped with solar panels to Asian Region, so it is able to develop and manufacture vehicles for telemedicine.
Public Health	Safety of environment/life	Taki Engineering Co., Ltd.	Develop an adsorbent that can adsorb and remove pollutants such as dust, bacteria, viruses, oil droplets, organic substances, and pigments dispersed in water.
Public Health	Safety of environment/life	Nihonkaisui Co., Ltd.	Develop a purification device that can quickly purify contaminated water, that contains oil and volatile organic compounds, to a level that can be discharged into rivers
Public Health	Safety of environment/life	Sanwa Tekki Co., Ltd.	Develop an adsorbent that can absorb and remove harmful substances from contaminated wastewater and soil easily, quickly and efficiently
Public Health	Safety of environment/life	BioRangers Co., Ltd.	Devise a method that can effectively purify soil which is polluted by petroleum hydrocarbons
Public Health	Safety of environment/life	Adsotech Co., Ltd.	Develop a purification device that can purify fresh water and seawater of sewage and aquaculture tanks by using ozone
Public Health	Safety of environment/life	Sanki Engineering Co., Ltd.	Develop a heat system that utilize the exhausted heat that is discarded in the environment
Public Health	Safety of environment/life	Ube Industries Co., Ltd.	Develop an exhaust gas treatment device that can reduce mercury emissions to a low level at low cost. Mainly used for cement manufacturing industry
Public Health	Safety of environment/life	ACR Co., Ltd.	Develop a catalyst that is durable to hot water and high SCR activity from low to high temperatures that cars can not run
Public Health	Safety of environment/life	Teraoka Seiko Co., Ltd.	Develop a label issuance management system to track production history at retail stores, (e.g., supermarkets)
Public Health	Safety of environment/life	LOZI Co., Ltd.	Have food traceability technology using QR code that is easily recognized and entered on smartphones, and involve in supply chain management of various businesses
Public Health	Safety of environment/life	Nishimu Electronics Industries Co., Ltd.	Have a "completely self-treatment flush toilet" that can be used even in a place where there is no utilities
Public Health	Prevention/Healthy Living	Cellspect Co., Ltd.	Develop a blood test device that can test multiple specimens simultaneously. Test blood quickly at low cost. Users can collect and test blood at stores.

【Figure C-4: Japanese technology company longlist (4/5)】

BUSINESS/PROPRIETARY TECHNOLOGY OF 61 SELECTED COMPANIES

Category and Theme		Company Name (In chronological order of extraction)	Business/Technology overview
Public Health	Prevention/Healthy Living	Quantum Biosystems Co., Ltd.	Develop a "DNA sequencer" that utilizes quantum mechanics. The product can analyze in short time & lower the cost 10 times (R & D stage).
Public Health	Prevention/Healthy Living	Nippon Jimuki Co., Ltd.	Develop a health goal management system that accurately evaluates health by integrated analysis of health examination results and health assessment and formulate an appropriate health plan for each user.
Public Health	Prevention/Healthy Living	Triple W Co., Ltd.	Plan, develop and sell "DFree", a excretion-prediction-device which helps reduce the worries and burden of excretion
Public Health	Infectious disease countermeasures	Aipore Co., Ltd.	Develop a device that measures the nanopore passage pulse of particles and identifies the varieties by AI. Identify viruses and bacteria in 5 minutes.
Public Health	Infectious disease countermeasures	Aeroshield Co., Ltd.	Develop "Aero Shield", an air environment device using ultraviolet irradiation to reduce bacteria in the air by 89.6%

【Figure C-5: Japanese technology company longlist (5/5)】

D. Other supplement materials

【Chart D-1: Expanded version of the left table in Figure 3-7-1】

Category	Sub category	Issues	Metrics
Public health	Macro level health care	Disease control	Prevalence of anemia in pregnant women
			Tuberculosis (TB) Incidence per 100,000 population
			Prevalence of high blood pressure population
			Prevalence of obese population above 18 years old
			Percentage of medicine and vaccine availability in community health center (Puskesmas)
		Maternal and children nutrition	Prevalence of Stunting / Wasting in children under 5 years
			Under-five Mortality per 1,000 live births
		Health care education	Regulation assuring female aged 15-49 years old to have sufficient knowledge about sexual health
			Percentage of women in productive age who needs family planning and use modern contraceptives
	Environment	Water access	Percentage of household who has access to clean and sustainable drinking water
			Number of cities who has wastewater infrastructure with city/area/community scale
		Sanitation	Percentage of houshold who has access to proper sanitation
		Polution	Proportion of safely managed liquid waste
			Numbers of recycled waste, including plastics
			Proportion of solid waste collected and processed in a city
			Amount of B3 (hazardous waste) managed in the industrial sector
			Air poluted level
	Social support	Social assistance	Number of people who receive low income support program
			Percentage of population live below poverty line
		Social insurance	Budget percentage for national social protection expense
			Proportion of labor insurance membership
			Percentage of people who has JKN/insurance membership
Health care	Health care infrustructure	Pharmaceuticals	Increasing the effectiveness of drug and food administration
		Medical devices	Sufficiency and increasing the competitiveness of pharmaceutical and medical devices availability
		Hospitals	Number of healthcare units/facilities
	Health care access	Access to detection	% early detection for critical deseases
		Access to doctor	% access to appropriate health care