Divergent Creativity for Requirement Elicitation Amid Pandemic: Experience from Real Consulting Project

Go out of the building *with a mask* and talk with the customer *from 2 meter distance*-How to foster creativity?

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Abstract

Pandemic situations impact the ability of the startups to identify the product features that have match with market needs; the activity that requires direct interaction with the customers at the same physical space. Online tools can overcome this limitation, but early stage startups have too limited resources and lack of access to the potential customers, which make their online interactions quite limited. The divergent creativity is required to identify the Requirement Elicitation methods and tools that could help startups to identify product/market fit with limited same physical space interaction with customers. The open innovation involving academia, experts and researchers could help startups to get access to the market needs. This paper reports one such consulting experience of the author with the Madrid (Spain) based startup which successfully identified its market in pandemic time through market research driven by secondary studies, primary research involving potential clients (or users) through online means and limited interactions at the same physical space. Daily brainstorming with a team of researchers, experts and professors helped to generate divergent ideas about identifying markets amid pandemic and testing them in real context that proved to be successful for the startup.

Keywords 1

Requirement Engineering, Startups, Startup-Academia partnerships, Coronavirus, Pandemic, Creativity.

1. Introduction

The Coronavirus pandemic had confronted the business community with the one biggest problem-how to survive; the biggest reason being the sudden dramatic shift of customer demands across various industries. Early stage startups face pressure because they don't have a market for their product yet. They need continuous interaction with potential customers to better understand the market and release the product that satisfies needs.

Creativity is defined as the ideas which are both novel and useful. Novelty could be considered from both software developing companies as well as customer point of view. Usefulness signifies that the novel ideas are able to deliver value to the customers. Creativity has an important role in Requirement Engineering as creativity helps the software companies to differentiate their software products from the competitors and achieve competitive advantage [1]. Creative ideas when implemented and commercialized becomes market innovations that determine the business success. The Requirement Elicitation (REL) is the main source of creative ideas about the software product as the ideas are derived

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directly from the actual users. Ideas could be about the software product, software engineering processes as well as tools. During pandemic if elicitation of requirements from users is challenging, more challenging is to identify the process and tools to execute elicitation activities due to limited support offered by the literature. Divergent creativity (ability to generate diverse solutions to the problem) and implementing the optimal one (driven by expertise of experts) will be a key to handle REL in time of pandemic.

Coronavirus Pandemic created a lot of business opportunities in the markets and startups could turn those opportunities in their favour through creativity. For instance, Swedish company Spotify (global leader in music streaming) has been able to gain success during pandemic by pivoting to make available podcasts to the users [2]. On the contrary, the UK based startup "HOOP" operating in the entertainment industry had to close down its operations as its value proposition provides to the parents the functionality to book the activities for their kids happening near to their locations [3]. The outdoor activities were not feasible due to lockdowns, so it badly impacted the startup leading to its closure. The first case signifies the successful implementation of the creative ideas related to the value proposition (i.e. podcast) and second case signifies the failure to be creative enough to succeed or at least survive in the markets.

The biggest reason for the failure of the startups is their inability to reach the product/market fit i.e. releasing the product (software in case of software startups) that does not meet the needs of the customers [4-5]. This process of identifying the customer problems (pains and gains) or requirements is termed as customer input gathering or requirement elicitation (depending on product/market fit) [6]. For the sake of simplicity, this paper uses requirement elicitation (REL) term to cover both categories. REL with the potential customers (primary market research) is the main source of creative ideas. These ideas are driven by the actual market facts rather based on intuitive judgements of the experts (in case of secondary researches or expert consulting).

REL involves the real face to face interaction with the customers to identify their requirements during early stages of the startup. Once the startup scales up in the market (with growing market share), the face to face interaction becomes difficult. Thus, in later stages of the startup, the product is evolved by getting access to the customer feedback through a variety of implicit and explicit feedback channels (for instance, crowdsourcing platforms, social media, Electronic emails, App store reviews and telephone calls etc.) [7].

During the pandemic, the face to face interaction with the customers at same physical space was least feasible due to lockdowns and social distancing norms in place. Sarcastically, the customer development principle of "go out of the building and talk with the customer" [8] is better to be rephrased with "Go out of the building *with a mask* and talk with the customer *from 2 meters* distance" (which we term as *customer development with Mask and 2 Meters gap* hereon wards). Face to face interactions with the customers help early stage startups to generation creative ideas (divergent creativity) about ideas, problem solutions and solution fit with the market, which is greatly affected because of the restrictions imposed to contain the coronavirus. For instance, startups could validate their solutions by validating the prototype equivalent with the customers.

This limitation is easily managed through the use of online communication tools and REL is felicitated with the increasingly freely available secondary market reports and online availability of the potential customers. This limitation however remains a serious concern for several early stage startups because of their difficulty to contact potential customers for online face to face interaction as well at same physical space and lack of their market understanding. The pandemic offers an opportunity to the startups to tap into the online customer segments, but the problem pertains to utilizing the limited resources in value generating manner as well as motivating the customers to take part in interactions by overriding the trust factor incubated from less branding of early stage startups.

This paper reports the experience of the author with the Madrid (Spain) based startup (called "A") that explored its technology based product ("called "B") in foreign market (called "C") in the industry ("called "D") (Figure 1). The divergent creativity was possible with the diverse team of experts including the academics with rich experience in consultancy projects.

The details pertaining to the startup and its strategy is kept anonymous because disclosing such details will be helpful to its competitors. The experience report highlights the importance of the startup-academia partnership to foster innovation by the generation of creative ideas (divergent creativity) about the processes and tools to be used to identify the market for the product.

Figure 1: Divergent creative thinking for Market selection

2. Project and Divergent Creativity

The startup wanted to identify the market for its product (based on its patented technology) in the foreign country (C). It already has a product which it offers to three clients in different industries. The project work involved the active support of external experts and academic professors.

The objective is to find the attractiveness of the industry (D) for the startup product and if found promising then evaluation of the demand of the product in market (C). The industry attractiveness involved market research and it was found very promising. To evaluate if the product has the market in the country (c), the team went through following steps, each step helping the team to come up with better understanding of the market. Market understanding refers to evaluation of the product match with the market needs, for which it is important to collect requirements about competitor products and unfulfilled needs of the customers. Each step is thus a type of requirement elicitation.

Requirement Elicitation (through secondary market research)

a) Customer Analysis: Identification of the potential customers with high paying capacity and large network.

b) Competitor Analysis: Identifying the existing solutions, they are using and then to perform competitor analysis (including their prices, functionality, nonfunctional requirements, constraints etc.). The outcome is the positioning of the startup product with respect to the competitor offerings.

Requirement Elicitation (through primary market research)

c) Startup product validation. This involved demonstrating the product functionality to the potential customers through prototypes. This will help to solicit their interest in the product.

d) Direct Requirement Elicitation (REL): REL with the potential customers to identify their unmet needs i.e. those that could be added to the existing product to offer more value.

Product Customization based on Release planning

e) Product Customization: The potential customers can be segments based on their common needs. The product offering can be customised as per needs of each segment. Section 5, through Client opportunity table (Table 2) highlight the steps involved.

The validation and elicitation involved the real interaction with the ´potential customers through email, telephone calls, LinkedIn messages, online video calls and personal face to face meetings. The interactions helped to gather their pain points and the gains they expected from the product which formed the basis of the evaluation of the startup product market. In other words, the capability of the startup product was evaluated against the elicited pains and gains of the potential clients. The gaps (if any) were the suggestions for the adaption of the product as per market needs.

The daily meetings were conducted with the leading experts and professors to discuss the daily findings. The suggestions resulted in new directions as well which helped to further explore the problem domain. Finally, the results of the research were presented to the panel consisting of the founders of different startups, experts, founders, and other researchers.

This process involves validation of series of assumptions about the Business model which have high chances of success in the market (c) (termed as hypothesis testing). Rich expertise available within the academia is helpful to startups to explore the problem domain and commercialize the creative idea. Power of startup-academia partnership for fostering innovation had been reported in [9]. Further, academia is more guided by the intrinsic motivation factors to contribute rather than extrinsic factors

(for instance through financial expectations). This is grounded on the results reported in the recently conducted research study in [10].

The divergent creativity felicitated by the involvement of the authors (researchers), academicians and other experts helped to enhance the problem domain understanding by accessing the secondary studies and reduce the number of same physical space meetings with the customers (Figure 2).

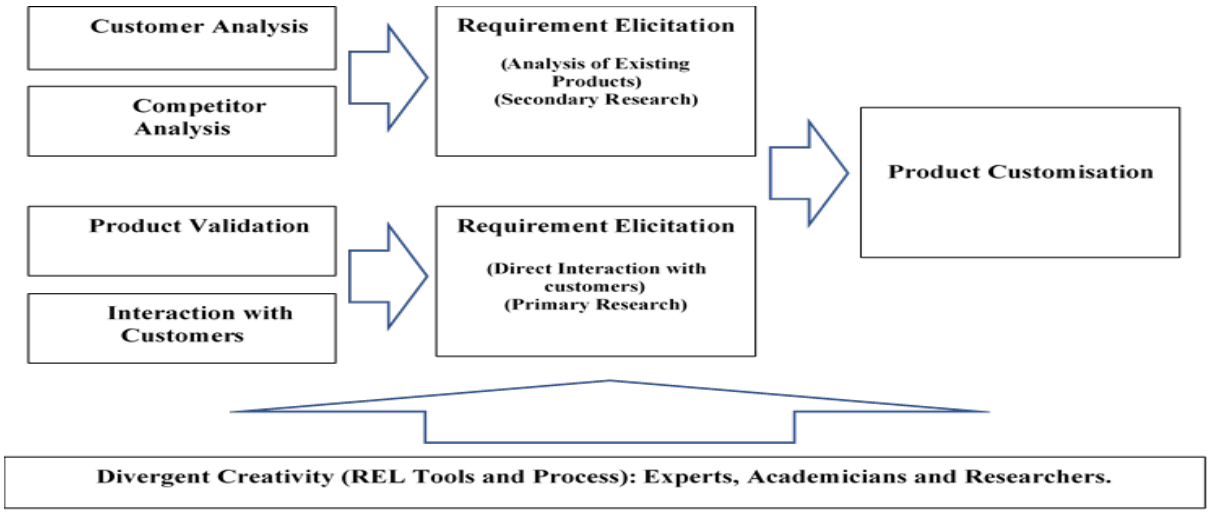


Figure 2: Requirement Elicitation and Divergent creativity.

3. Blended Techniques for customer development with Mask and 2 Meters gap

The formulation of the effective business model of the startup for the market (c) by series of hypothesis testing strongly depends on the quality of learning (or insights) brought by direct interactions with the customers and those brought by observations of the potential customer sites. Pandemic situation seriously affected the ability to have face to face interactions and real observations in the market. Solely relying on secondary data analysis for market analysis or on the expert advice would not have supplemented the need for face to face interactions (primary research). To turn a pandemic situation into opportunity, the combination of face to face interactions, online interactions, observing customer sites physically and secondary market research was used.

The biggest challenge the author faced was the study was conducted in highly uncertain business environment. Further there was limited support from the literature on which REL tools and techniques are effective in startup context and under which circumstances.

To generate diverge ideas about REL and apply them to identify best customers for the Startup, there was a need for knowledge transfer from experts especially academicians. This is felicitated through continuous and frequent knowledge sharing daily helped a lot to reduce our assumptions about the market.

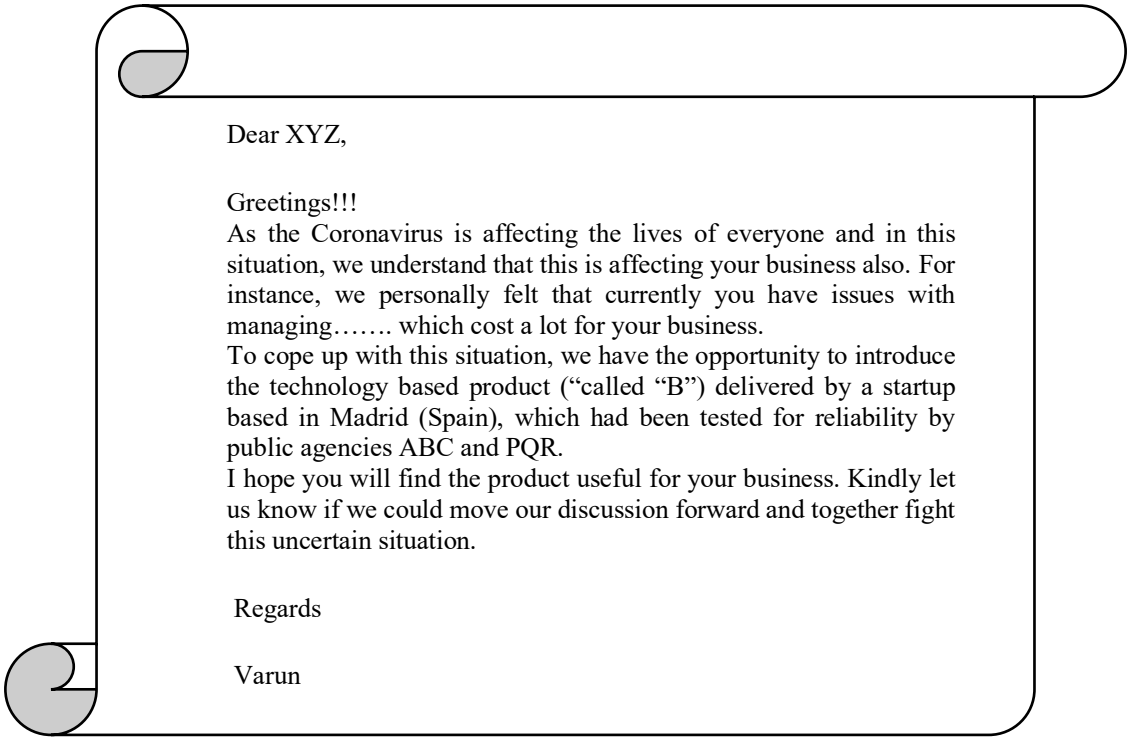
The market research is decomposed into three stages as discussed below.

a) Initial Research: Initial research should involve interactions with the persons with good expertise in the industry your product aims to serve. The expert could be identified from blogs (for instance, people writing about problems in the Industry of the market (c)) and LinkedIn search. During pandemic a lot of secondary material is being published, which is freely accessible to the readers. This could also help to provide initial pointers for solving the problem.
b) Emerging research: Contact your potential clients to identify their current solutions, their unaddressed needs and their cost structures. Keep in continuous touch with the startup and the academia experts. This will help to brainstorm about the business environment of the clients and the startup. This helps to formulate strategies to enter the market with the product based on the Strengths, weaknesses, Threats and Opportunities (SWOT) analysis.

c) Final Research: Customize your product offerings and target the potential clients with the suitable marketing campaigns. At this stage the team knows exactly how their product could address the needs of their clients and which cluster of clients forms a segment (can be addressed using similar marketing campaigns).

The blended techniques used in each market research stage for fostering creativity in REL include the following:

a) E-Mails: This communication is better to be made with the potential clients. However, special focus must be made while drafting the e-mails. The e-mail content should concisely describe your product addressing the needs that you identified through initial research. This will help to get customer attraction for further interactions. This should not be seen as a promotion email of a product but should be based on pains you identified through initial research. A sample of the E-mail is shown in Figure 3.


Dear XYZ,

Greetings!!!
As the Coronavirus is affecting the lives of everyone and in this situation, we understand that this is affecting your business also. For instance, we personally felt that currently you have issues with managing……. which cost a lot for your business.
To cope up with this situation, we have the opportunity to introduce the technology based product ("called "B") delivered by a startup based in Madrid (Spain), which had been tested for reliability by public agencies ABC and PQR.
I hope you will find the product useful for your business. Kindly let us know if we could move our discussion forward and together fight this uncertain situation.

Regards

Varun

Figure 3: Sample Email (Initial Research)

E-mail communication should be avoided if you see customer interest in your product. The focus should be on face to face interactions through physical meetings (if the client is near to your location) or through online communication tools.

b) Online Meetings Tools: The online meeting tools are free for use. This includes Zoom Meetings, Skype, Microsoft Teams, Google hangouts, LinkedIn Video calls and Facebook Video calls. There are no specific criteria to choose the online meeting tool except that you need to be flexible to select the one that suits your clients. For instance, for daily meetings with the university professors and the startup, we used the Zoom meetings. With different clients, we have to use different tools like Zoom, Teams, Google hangouts etc.

c) Collaboration Tools: If you are doing market research in a team or as an individual researcher then it is better to keep everyone duly informed about your observations and reasons for the findings. The simple excel or word document can be created and shared with the other members. Your team can use Slack as well to keep everyone synchronized.

The details of the blended market research techniques are given in Table 1.

Table 1.
Details of Market research: Blended techniques.

Research Stage	Activities	Type of Research	Stakeholders Involved	Knowledge Sources	Tools Used
Initial Research	Customer Analysis	Secondary Primary	Experts.	LinkedIn, Secondary reports, Blogs, Client websites.	Zoom, LinkedIn chats.
	Competitor Analysis		Startup, University professors.	Websites, LinkedIn.	E-Mails.
Emerging Research	Product Validation	Primary	Startup, University professors.	Face to face interactions with clients.	Physical presence in client site (Minimal). Online meeting tools. Brochures *(Keep this option limited)*
	Direct Requirement Elicitation				Online meetings tools.
Final Research	Product Customization.	Primary	Startup, University professors.		Details Brochures. Animations.

In our consulting project for the Madrid based startup, we have used the consortium of market research techniques to better understand the market at specific levels of customer segments. The analysis helped to validate if the product has competitive advantage in terms of its ability to successfully serve the segments with respect to existing competitors. The analysis was divided into three levels of research-initial, emerging, and final. Each level has unfolded the market information and helps to focus the following level of research. Emerging research stage involved market research focused on understanding customer needs or requirements (pains and gains) by face to face interactions with them using a consortium of primary market research techniques like interviews and observations. The product validation also helped us to identify their "hidden" needs by simulating their interaction with the paper prototypes. However, a good secondary research helped the team to reduce the need for same physical space interactions with the customers. Our estimation says that we spend around 70% efforts on secondary research and 30% on primary research. Out of primary research (30% of total effort), same physical space interactions were limited to 40%.

The involvement of the academicians and experts helped to use provide necessary guidelines driven by their experience with market and the product leading to the generation as well as validation of the divergent ideas about REL tools and processes. As mentioned before, the pandemic situation and limited support from literature made it quite hard to execute the project. Involvement of diverse experts with diverse experience in management and software engineering helped to exhibit creativity amid pandemic uncertainty. The techniques (Table 1) worked perfectly with our team. The techniques or their sequence is not universal and hence other consultants could adapt it as per their needs.

4. Lessons Learned

Working on the consulting project led to the frequent interactions with the potential customers to identify their needs, which could be addressed by the startup product. The interaction was conducted through the online tools because of the coronavirus restrictions in place. The useful lessons learned during the consulting project include the following:

a) Gain deep understanding of the startup product in terms of its functionality, limitations, applications, non-functional aspects (especially performance, reliability, certifications, speed etc.). This understanding will help you to gather meaningful information about competitor products and customer exact needs.
b) Try to find knowledgeable people with a good understanding of the market and the industry. They will help you to identify the promising clients that could be targeted for your product adaptation. Also, secondary market research is also a very useful tool about the industry and the market leaders.
c) Identify the solutions that potential clients are already using by extracting the information from their websites, response to the covid web pages, LinkedIn profiles or secondary sources like the news reports. Categorize them into two categories-Highly potential (client currently not using any solution or using indirect competitor product) and Potential (client using solution of the direct competitor). Email exchanges with the clients can also be very useful to extract such information. Depending on the time available, the requirement elicitation could start with Highly potential clients (as the product switching cost is zero for these clients). Analysis of the competitor will help you to identify the sustainability of competitive advantage of your product.
d) Don't hesitate to ask the clients about their problems with existing solutions and the reasons for not buying the product. This could signify deficiencies in your product or constraints at client side.
e) Prepare simple prototypes that non-technical customers could understand. The prototypes should be customised as per individual client needs. The prototypes should be based on the (a) features provided by your product that are missing in the competitor product and (b) unaddressed needs of the clients (pains and gains). The prototypes could include a graphical animation, video of running product etc.
f) The continuous interactions between the team, with the experts and with the clients helps to bridge the knowledge gaps.
g) To generate diverse creative ideas, the team should have diversity in expertise, knowledge, skills and background. The team should have software engineering background as well as those with management background. This helps to merge the management aspects with engineering aspects, that is required to explore the problem domain.
h) Be flexible with the tools that your client wants you to use for interactions.
i) Use blended market research techniques including primary and secondary research. Use both online and offline primary research to better understand the market and customize your product for identified segments. It is not the complex tools that will help you to succeed but it is the unfolding of the market knowledge that will help to have an effective business model. A good secondary research could reduce the primary market research efforts.
j) The brand reputation of the consultant, consultant affiliation (for instance university) and involved professor's reputation has a strong impact on the motivation of the potential customers to take part in interactions. During initial research, the customers hesitate to agree to interact with the startup team, but their hesitation is lowered based on the brand reputation of the participating academia institution.

The REL in these contexts is better achieved through simple prototypes with frequent interactions with the clients. The software solutions can be easily adapted to the client's needs and hence the startup could select the clients with "almost" similar needs. The ability to generate creative ideas is dependent on the accuracy of identification of the competitor software product features which impacts the details provided by the prototypes and finally triggers the interest of the clients in the product offerings. Remember that each interaction with the client is giving you access to the rich database of their needs which could be useful to address the various assumptions you have about their contexts (for instance, their experience with the competitor products).

The involvement of the academia in the project helped to attain:

- Rich experience from management and software engineering aspects.
- University brand reputation that helped team to establish meetings with the customers (otherwise they will not be willing to have online meetings).

- Free access to the market information in form of secondary studies and specialist working in universities.
- Involvement of the academic experts (belonging to other universities) that are in their professional network.
- Avoiding taking wrong routes which could have strongly impacted the market research.

The involvement of the startup team in the project helped to attain:

- Quick validation of the diverse ideas about REL processes, tools and gathered requirements.
- Involvement highlight startup prowess to expand market even under pandemic which represented their seriousness towards expansion.

5. Implications to Product Manager

The software startups have inbuilt capability to be adapted to the work from home restrictions during pandemic as software engineering activities require access to computing resources and the internet. The online collaboration and communication tools help to synchronize their work, help them meet deadlines and reach milestones. REL is not a "inside room" activity, it requires continuous face to face interactions with the customers, preferably through direct interactions at same physical space.

Due to pandemic, the startups innovated by conducting this activity through online communication tools. However, the startups will be greatly benefited if they will get access to real customer needs with little investing in the resources. This is possible with the partnership with the academia and outsourcing this activity to them as a consultancy project. Academia as a part of their academic curriculum will be happy to undertake such a project, which could be very meaningful to the startups to gain business opportunities amid pandemic.

The product manager could take following steps to make informed decisions about which clients to serve and with which product features. The quality of the selection decision depends on the accuracy of the identified requirements and their sources (clients). This is influenced with the ability of the managers to unfold the layers of market information using blended market research techniques-series of primary and secondary techniques; with primary techniques composed of an intermix array of online and physical space meetings with the potential clients.

Having trusted the quality of this information, the product manager can decide the adaption of their product as per market needs for customer segments as follows.

a) Identify the software product requirements as identified through interactions with the clients by the academia. Remember that requirements are the representatives of the pains and gains.
b) Map the clients against the software product requirements as shown in Table 2. The size of the client represents the opportunity it provides to the startup. For instance, if a client is a group of 12 showrooms. If each showroom needs 10 licenses of the software, then approx. 100 licenses will be sold (considering all sites need different number of licenses). The 100 will be represented by appropriate size.
c) Select the suitable clients and corresponding requirements. The product may need customization by adding extra requirements to the basic requirement set.

Table 2
Client opportunity table.

Basic product functionality: Requirements 1, 2, 3, 4.		
Requirement numbers	**Client**	**Client Size**
1, 2, 3, 4, 5	C1	14
1, 2, 4, 5, 6	C2	12
2,3,4,5,6,7	C3	10
1,2,4,5,6,7,8	C4	12
1,2,3,4,5	C5	13

The software offering of the startup is composed of four requirements i.e. 1, 2, 3 and 4. In case startup decide to customize the software by adding new functionality i.e. 5, then could attract client C1 and C5, with total opportunity of 25. Adding one more requirement i.e. 6, increases the clients to 3 and opportunity to 37.

6. Conclusion

The requirement elicitation (source of creative ideas about the product) is hard to be conducted during the pandemic due to social distancing norms. However, the startup-academia partnerships could provide the startups with easy access to the customer needs which otherwise is effortful to be conducted by the in-house team. Working in the teams and daily brainstorming sessions helped to generate diverse creative ideas and converge them into meaningful insights which are valuable to the startup. These meetings were the key to bridge knowledge gaps and to unfold market information. The blended market research techniques involving online as well as offline interactions with the customers supplemented by secondary market research and expert advice really helped to unfold market understanding. The interaction with the potential customers has to place in a higher uncertain environment amid pandemic so it is important to enhance your market understanding with "right question" addressed to "right customers" rather focusing on selection of complex tools. The team must be flexible with the tool selection which strongly depends on the customer context. Evaluation of the demand in the new market for existing products requires face to face interactions with the potential customers to identify their requirements about potential products and then adapting the offering as per new market (also called as customization of the product). The academia support could be a game changer for the resource stripped startups especially for providing roadmap for market research, generation & implementation of creative ideas and overcoming customers hesitation for participation in REL activities due to early stage startup low branding by their strong academic reputation.

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