Screening New Product Ideas Through User-Generated Content in Social Media to Assist Small and Medium Enterprises in New Product Development

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Endorsement

Dedication

I dedicate this capstone project to all the small and medium enterprises’ owners and their employees who have been working so hard to continue their business operations during these trying times.

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Chapter 1

Introduction

**1.1. Background of the Study**

The recent assessment made by the National Economic Development Authority (2020) showed that the Philippines’ Luzon-wide lockdown, which aims to control Corona Virus Disease (COVID-19), has resulted in an accumulated output loss of 1.1 trillion pesos. Moreover, the Philippines Statistics Authority (2020) has recorded its highest unemployment rate ever. As early as the second quarter of 2020, it rose to 17.7%, amounting to 7.3 jobless Filipinos. Hoping to reduce any further losses and stabilize the economy, the Inter-Agency Task Force recommends the implementation of General Community Quarantine (GCQ). This new and lenient version of the quarantine has allowed business operations and other economic activities to resume. However, GCQ had little to no effect because the consumers’ confidence has influenced their buying habits. People have become conservative and cautious about where they spend their money. Consequently, the government has rolled out programs to help affected businesses and their employees. In particular, through Bayanihan to Heal as One Act, companies have given a 30-day grace period to pay for rents without incurring any penalties and even have the option to settle it in six-month time.

Furthermore, the new amended law recognizes how the global pandemic negatively affected the Small and Medium Enterprises (SMEs); through Small Business Subsidy Wage (SBSW), SMEs have given access to the financial support they need to continue their operations. Accordingly, SBSW allows SMEs to take a loan ranging from 200,000 to half a million pesos depending on the company's asset. The loan has an interest rate of 0.5% and 0.6% per month and per annum, respectively, which is far lower than Banks' 7% on average. Also, they could pay the subsidy in a much longer time. Nevertheless, these efforts can only do so much to assist SMEs in their operations for a few more months. Meanwhile, there are no signs that the pandemic will come to an end anytime soon. Unless there is an approved vaccine, SMEs need to be creative in finding ways to survive. Otherwise, they will have to shut down. Currently, the outbreak has culminated in the closure of 200 companies and temporarily halted 3,000 more. Experts predicted that the Philippines' economy might collapse if this trend continues, causing more Filipinos to drown in poverty (Bouey, 2020).

For the past few months, we have experienced the transition from the pre-COVID-19 phase to the “new normal”. The new normal, among other things, taught us that we could continue living, even in the comfort of our own home. In doing so, people realized how essential and useful Social Media (SM) (e.g., Facebook, Instagram, Twitter, YouTube, and LinkedIn.) in everyday living. As a result, the usage of SM has increased lately. To illustrate, Facebook Reports on Second Quarter of 2020 shows that their daily active users (DAU) and monthly active users (MAU) remarkably grew. In particular, there have been 1.79 billion people accessing Facebook daily and 2.70 billion people every month. Most notably, Facebook has given SMEs channel to grow and prosper during these trying times. Likewise, Twitter reached its highest Monetizable Active Daily Users (MDAU) since it launched in 2006. According to Twitter’s quarterly report for 2020, its MDAU improved by 34%, approximately 186 million paying users monthly. The platform has been beneficial in providing information about worldwide happenings, especially on the updates regarding COVID-19. Lastly, Instagram broke a record when it hit its highest number of users using stories daily. Specifically, more than 500 million Instagram users used the story in a day, of which 200 million are business-related (Clement, 2020). Story is the most widely-used feature of the photo and video sharing application, and it serves as a tool to showcase people’s lives and businesses in almost every part of the world. According to Clement (2020), the increase in SM users will grow even further in the coming years, as people and businesses become more dependent on these applications. The research projected that the number of users would double in 2025.

New Product Development (NPD) is a process that transforms market opportunities into a product available for sale. The output of NPD does not always need to be new and innovative. Usually, it is an extension or an improvement of the existing product, or perhaps a cheaper version to capture more market. It consists of seven stages, including new product strategy development, idea generation, screening and evaluation, business analysis, development, testing, and commercialization (Booz, & Allen & Hamilton, 1982). Initially, NPD follows a rigid sequential order. For instance, the new product strategy development phase must come first before the idea generation, and once new product strategy development is complete, it is final and almost impossible to make any modification. Since every stage is highly dependent on its predecessors, meeting the deadline becomes an issue. On average, it takes ten years for a single new product to reach its official launch in the market. Over the years, it has improved, considering the speed and flexibility, without compromising product quality. For instance, Takeuchi & Nonaka (1986) introduce the rugby approach to remove dependencies by allowing processes to start simultaneously and flexibly go back to the previous stages if changes are necessary. In addition, Koetler and Keller (2011) added two more phases before the business analysis: marketing strategy and concept development and testing to make the foundation of the product development stronger which reduces failures. Other improvements in NPD include creating agile development for incrementally adding new features to the product, design thinking for generating ideas, and lean innovation for efficient product development (Cooper, 2019).

Recent studies have shown that user-generated content (UGC) (e.g., posts, comments, reviews, and tweets) is a valuable source of information when conducting NPD, especially during new product idea generation and screening. According to Sindhav (2011), social validation, social information, and social inspiration are the three main driving forces for users to contribute to product idea generation. UGC is any content such as text, image, video, and even audio, created by the users, rather than the brands, to express one’s opinion, sentiment, idea, and support to something including academics, politics, and businesses. Studies such as Sindhav (2011), Bashir, Papamichail, & Malik (2017), Nascimento & Da Silveira (2017), Carlson et al. (2018), Bhimani, Mention, & Barlatier (2018), Ram & Lieu (2018), & Baum et al. (2019) explain that data created by SM users can provide insights into what new products that consumers might want and need. Also, Prantl & Micik (2019), Balan & Rege (2017), & Baum et al. (2019) claim that UGC can be beneficial in screening new product ideas. Filieri (2012) performs one of the few and first studies that emphasize consumers as co-creators in NPD’s early stages. The research analyzes customers’ participation and engagements on the web. The study gained enough knowledge to develop new food products and additional services for an existing food company. Similarly, Kao, Yang, Wu, & Cheng (2016) propose the interact-engage-propose-act-realize (IEPAR) model that allows enterprises to include consumers as part of the product value creation. The model provides a step by step process in determining valuable insights to improve product concepts through UGC. Another, Hasan (2018) examines the different ways to utilize users’ feedback and suggestions to generate and improve product ideas. The research found out that the next products of the tech company Glostar, which is the subject of the experiment, should be in line with its core values and existing products. The company’s users want to have more freedom to express, create, and share all kinds of content, such as images, videos, and music that their current platform cannot provide. Lastly, Rathore & Ilavasaran (2020) analyze the impact of the consumers’ pre- and post-launch emotions in three types of new products from three well-known brands in the food, car, and phone industry. The study uses tweets from Twitter to classify consumers’ perceived emotions into anger, anticipation, disgust, fear, joy, negative, positive, sadness, surprise, and trust. Companies obtained insights on what and where to develop their new products before it becomes available to the market.

Due to the massive amount of publicly available UGC on SM and the proliferation of tools for data mining and analytics, studies suggest that there is a need to take advantage of these data to generate and screen new product ideas (Kelly & Storey, 2000; Nascimento & Da Silveira, 2017). Additionally, Magnusson, Wästlund & Netz (2016) emphasize that a mixed technical and non-technical people complement each other, which yields to an idea with a high percentage of success. Currently, no study has utilized the UGC on SM to screen new product ideas for SMEs. SMEs are the backbone of the economy, and in the Philippines, 80% of the businesses are considered SMEs, which makes up to 28.9% of the total workforce nationwide (PSA, 2020). Screening new product ideas remains a tedious and resource-intensive, especially for SMEs, yet only 20% of new products launched every year make it to the market (Ford & Terris, 2017; Rodríguez-Ferradas & Alfaro-Tanco, 2016; Akram, 2017). Nevertheless, Booz, Allen & Hamilton (1982) & Ford & Terris (2017) encourage SMEs to consider NPD to stay competitive and achieve prosperity in a rapidly changing market. Hughes and Chaffin (1996) invigorate that in a such fast-paced environment, NPD needs to become iterative in nature and to be able to take advantage the continuous feedback from the consumers.

**1.2.** **Research Objective**

1. To identify the success factors for screening new product ideas through UGC on SM.
2. To develop a dashboard for screening new product ideas.
3. To identify the most impactful success factor for SMEs.
4. To name viable new product ideas for SMEs

**1.3. Scope of the Project**

The research focuses on evaluating new product ideas of SMEs in the Philippines.

**1.4. Significance of the Study**

1. The research will encourage SMEs to be engaged in NPD.
2. The research will assist SMEs in examining which product ideas have the potential to be launched in the market.

Chapter 2

Methodology

**2.1. Identifying the success factors**

**Literature review**

A total of 14 papers were reviewed to identify the success factors needed to screen new product ideas from SMEs. There were two main criteria for the selection. First, success factor should be tested out in an empirical study. Second, success factor could be measured through UGC on SM. Although there are tons of success factors for screening new product ideas, few studies perform an actual experiment to prove its effectiveness. To ensure that success factors are reliable and effective, only those subjected to empirical studies and tested out to at least three real organizations or companies were considered *(See Table 1)*. Once the success factors were identified, another filtering was done with the intention of disregarding those that cannot be extracted nor evaluated through UGC on SM, for example financial data and company culture *(See Appendix A)*. Finally, the list were categorized into four main success factors. Brentani (1986) argues that the number of criteria for screening new product ideas does not impact the result. He concludes that fewer criteria simplify the screening process, which could save up time and resources. Some researchers even claim that few are more and could help improve decision making (Albar and Kocaoglu, 2009; Fasolo et al., 2007; Rieskamp and Hoffrage, 1999).

To quantify the success factors, researcher created a business profile in various social media platforms to know what metrics these applications are capable of measuring and how it is being measured. The metrics were adopted and mapped into four success identified above. For instance, Facebook keeps track of the number of likes and shares made by consumers to measure customer satisfaction, which could be used to measure the competitiveness of the new product idea against other similar products. By knowing these metrics, businesses would know how their products are performing in the perspective of their customers and their competitors. Once the result was available, further analysis was made.

**2.2 Developing the dashboard**

**Collecting new product ideas**

The new product ideas subject for screening were taken from the Philippines’ SMEs, who recently launched new products, specifically from October 10-30, 2020. Because the research needed enough data to be mined and analyzed to perform the screening, one important consideration for selection was the online presence. In particular, the number of combined followers from Facebook, Twitter, and Instagram should be at least 10,000, and the SME used hashtags when posting about their new offerings. The 20 new product ideas selected covers different industries including food, beverage, accessories, beauty, arts, and toys *(See Table 1)*.

**Selecting model for screening**

The application used the Tallying model (TM) for screening each new product idea (See figure 1). The model was previously presented by Albar & Jetter (2013) to compare the performance of logistic regression against other models (take the best (TTB), tallying, and elimination by aspect (EBA) models) in terms of screening new product ideas. Among the three models, TM has the highest overall performance of 77 %. Specifically, it has a failure and success percentage of 74% and 81%, respectively. Other than its performance, TM was chosen as the model for the application because compared to TTB and EBA, it evaluates all the criteria before returning an output, which is essential for analysis. It is also complicated enough to showcase the feature of the application and simple enough to be implemented. Baker & Albaum (1986) suggest that people involve in NPD resist and are often abandoned, complex models.

The basis for new product idea screening against the success factors was text-based UGC collected on various social media platforms, including Facebook, Twitter, and Instagram. The data were collected using specific keywords and hashtags that pertain to the SMEs and their new products. The screening process followed the scoring method used by Albar & Jetter (2013), which uses the numerical value of +1 for good, 0 for neutral, and –1 for poor to rank each new product idea against the four success factors identified above and got the sum. Once the evaluation is done, it returns the final value for interpretation. If the value is positive, then the idea is going to move forward. Otherwise, it would be rejected.

*Figure 1: Tallying Model (*Albar & Jetter, 2013)

Start

How does the new product idea satisfy this criterion?

Add the value to the counter “1 for good, -1 for bad, 0 for neutral”

Counter

Accept

Reject

0=>

>0

**System Architecture**

*Figure 2: The system architecture of the proposed application*

**Technology Stack**

**Programming language**

R is widely-used programming language by statisticians and data miners for developing a statistical and data-driven applications.

**Shiny**

It is an R package for building interactive web application. It has three main components user interface, server function, and the shinyapp function that fuses the former components.

**User interface (ui.R)**

It is the front-end component of the Shiny package that uses to accept input from the users.

**Server function (server.R)**

It is the back-end component of the Shiny package that processes the input.

**ShinyApp function**

**Database**

**2.3 Identifying the most impactful success factor for SMEs**

The result of each new product idea were compared to determine the most impactful success factors for SMEs.

**2.4 Naming viable new product ideas for SMEs.**

Chapter 3

Results and Discussions

**3.1 Success factors**

*Table 2*

*List of the success factors for screening new product ideas and their measurements*

|  |  |  |  |
| --- | --- | --- | --- |
| **Literatures** | **Success Factors** | **Description** | **Measurements** |
| [1] Cooper (1979),  [5] Brentani (1986),  [4] Baker & Albaum (1986),  [2] Debrentani (1988),  [6] Hughes (1996),  [9] Onarheim (2012),  Albar & Jetter (2013),  [7] Magnusson, Wästlund & Netz (2016),  [10] Soukhoroukova, Spann, Skiera (2011), | Competitive Advantage | Dominance | Customer satisfaction  -sentiment analysis towards the new product idea itself  Competitors growth  -sentiment analysis towards similar products |
| [1] Cooper (1979),  [5] Brentani (1986),  [4] Baker & Albaum (1986),  [2] Debrentani (1988),  [3] Albar & Jetter (2013),  [8] Kelly & Storey (2000),  [7] Magnusson, Wästlund & Netz (2016) | Resources | Online presence | -Number of social media accounts  -Number of posts/tweets/stories/replies |
| [1] Cooper (1979),  [5] Brentani (1986),  [4] Baker & Albaum (1986),  [2] Debrentani (1988),  [6] Hughes (1996),  [8] Kelly & Storey (2000), [3] Albar & Jetter (2013) | Demand | Brand awareness | Number of followers  Number of likes, loves, shares, retweets, and comments  Engagement rate |
| [1] Cooper (1979),  [5] Brentani (1986),  [2] Debrentani (1988),  [12] Huang (2002),  [13] Mu, Peng, & Tan (2007),  [11] Gutierrez, Kihlander, & Erikson (2009) | Skills | Online activities | Number of reached  -sentiment analysis on the diversity of UGC related to the new product idea |

The literature review identified four widely-used, and empirically tested success factors for screening new product ideas. From the initial 14 literature, only 13 made it to the final selection because the success factors included in the literature number [14] are mostly related to company culture and financial data that cannot be extracted from social media.

**Competitive advantage**

Among the four success factors identified, competitive advantage is the most-often used for screening new product ideas. Specifically, eight out of the 13 studies say that it is an essential consideration for screening [1][5][4][2][6][9][7][10].

**Measurements for competitive advantage**

The competitive advantage was measured through customer satisfaction and competitor’s growth. Sentiment analysis was used to measure their customers' satisfaction towards the new product ideas and performance of similar products available in the market.

**Resources**

Out of the 13 works of literature, 6 made use of resources as a determining factor for screening new product ideas [1][5][4][2][3][8][7]. Generally, resources pertain to time, financial, workforce, and technology available within an organization concerning the new product idea. Since the new product ideas used in the research were already executed and launched, time was removed from the equation. Similarly, the financial data was too sensitive to be shared on the SM, so it was disregarded. For the analysis, it was mainly human resources and technology were considered. In the context of this study, the workforce refers to the number of people working on a particular new product idea, and technology describes as the number of social media platforms being used to promote the new product idea by a particular SME and to serve their customers.

**Measurements for resources**

The resources were measured through the online presence of the SME and the new product idea itself. The number of posts, tweets, stories, and replies by the SMEs in each social media platform was collected.

**Skills**

Skills were mentioned seven times in 13 literatures reviewed [1][5][4][2][6][8]. In a typical formal organization, skills refer to the three departments or people working together to execute common goals. For example, the marketing department focuses on sales, engineering for product development, and executives for the company's overall operations.

**Measurements for skills**

To measure the skills of the SMEs, the diversity of UGC on SM related to the new product idea was collected, and sentiment analysis was performed.

**Demand**

Demand was referenced to be a significant success factor in 8 empirical studies [1][5] [4] [2][6] [8].

**Measurements for demand**

The demand was measured through the number of followers, likes, loves, shares, comments, retweets, and daily engagement rates.

**3.2 Dashboard**

**New product ideas**

*Table 1*

*Selected new product ideas for screening*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No** | **SME** | **New product idea** | **No of followers** | **Hashtags** |
| 1 | Aegyo Cakes  (Food) | Korean minimalist cake | 78,089 | #minimalistcake  #aegyocakes  #dedicationcakes  #cakedesign |
| 2 | Tala by Kyla  (Jewelry) | Customized necklace | 1,488,091 | #talabykyla  #talabykylaitgirlgiveaway |
| 3 | Plantfairy Manila  (Home accessories) | Air plants | 11,897 | #plantfairy  #plantsmanila  #indoorplants |
| 4 | 11.11 Philippines  (Beverage) | Beauty drinks | 13,904 | #foodventure  #foodcrawl |
| 5 | The Vegan Grocer PH  (Food) | Plant-based and keto vegan products | 80,488 | #vegangrocerhaul  #veganlife  #MSGfree |
| 6 | Harper and Harlow PH  (Home accessories) | Home accessories | 85,100 | #aesthetichomes  #harperandharlow |
| 7 | KJM Cosmetics  (Beauty) | Cruelty-free lip make up | 228,000 | #cleanbeauty  #makeup  #cosmetics |
| 8 | Pretty Home PH  (Home accessories) | Decorative table wares | 13,200 | #tablecapes  #tablesetting  #tablestyling |
| 9 | Ellana Minerals  (Beauty) | Skin brightening serum | 387,800 | #betterskin #skinfirst #asianbeauty |
| 10 | Our Swimsuit Manila  (Clothing) | Sleepwear | 64,300 | #sleepwearph #personalizedsleepwear #pajamasph |
| 11 | The Original Baked California Roll | Baked sushi | 33,300 | #sushibaked  #sushiph |
| 12 | Unlimited Manila  (Personal accessories) | Corkcircle | 47,200 | #Drinkallday #unlimitedmanila #corkcicleph |
| 13 | The Pink Gamer PH  (Gaming) | Pink and girly gaming keyboards | 32,300 | #kawaiigamer #femalegamer #girlysetups |
| 14 | Petalier  (Gifts) | Flower boquet and balloons arrangements | 71,900 | #luxuriouscelebrations  #petalier |
| 15 | Kees Collection  (Personal accessories) | Minimalist and gender-neutral sandal | 25,400 | #livesimply #handmadeph #lessismore |
| 16 | House of Madison  (Toys) | Wooden playthings | 43,800 | #educationaltoysph  #kitchentoys #playpretendph |
| 17 | Trend Artisans  (Personal accessories) | Customizable bottle/tumbler | 62,100 | #filipinofood #pinoyfood |
| 18 | Sinaya Cup  (Personal accessories) | Menstrual cup | 12,800 | #plasticfreeperiod #flowforward #bodypositivity |
| 19 | Magayon Homemade  (Arts) | Rattan bag | 29,800 | #ratanbag #gawangpinoy #wearyourculture  #abacaphilippines |
| 20 | Booty Band PH  (Gym accessories) | Booty band | 27,200 | #bootybands #resistancebandsph #homeworkouts |

*Table 3*

*Results of the screening*

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **New product idea** | **Value** | **Remarks** |
| 1 | Korean minimalist cake |  |  |
| 2 | Customized necklace |  |  |
| 3 | Air plants |  |  |
| 4 | Beauty drinks |  |  |
| 5 | Plant-based and keto vegan products |  |  |
| 6 | Home accessories |  |  |
| 7 | Cruelty-free lip make up |  |  |
| 8 | Decorative table wares |  |  |
| 9 | Skin brightening serum |  |  |
| 10 | Sleepwear |  |  |
| 11 | Baked sushi |  |  |
| 12 | Corkcircle |  |  |
| 13 | Pink and girly gaming keyboards |  |  |
| 14 | Flower boquet and balloons arrangements |  |  |
| 15 | Minimalist and gender-neutral sandal |  |  |
| 16 | Wooden playthings |  |  |
| 17 | Customizable bottle/tumbler |  |  |
| 18 | Menstrual cup |  |  |
| 19 | Rattan bag |  |  |
| 20 | Booty band |  |  |

**Korean Minimalist Cake**

**Customized necklace**

**Air plants**

**Beauty drinks**

**Plant-based and keto vegan products**

**Home accessories**

**Cruelty-free lip make up**

**Decorative table wares**

**Skin brightening serum**

**Sleepwear**

**Baked sushi**

**Corkcircle**

**Pink and girly gaming keyboards**

**Flower boquet and balloons arrangements**

**Minimalist and gender-neutral sandal**

**Wooden playthings**

**Customizable bottle/tumbler**

**Menstrual cup**

**Rattan bag**

**Booty band**

**3.3 Most impactful success factor for SMEs.**

**3.4 New product ideas for SMEs.**

Chapter 4

Conclusions

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Appendixes

Appendix A

*List of the literatures reviewed for selecting the success factors for screening*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Literature** | **Sample** | **Data Collection** | **Variables** |
| [1] | Cooper (1979) | 103 industrial firms that were active in product development. | Questionnaire | **Market variables**  -Degree of need for products in product class  -Market growth  -Degree of satisfaction with competitors’ product  **Firm variables**  -Sales force/distribution resources and skills  -Marketing research skills  -Management skills  -Advertising and promotion skills and resources  **Nature of the venture**  -Innovativeness of the product to the market  -Newness of the type of customer need served to the firm  -Newness of the product class to the firm |
| [2] | Debrentani (1988) | 63 firms | Questionnaire | **Overall corporate synergy**  -excellent fit with the present business  -fits current organizational and functional set-up  -fits management capabilities  **Production synergy**  -excellent fit with current production facilities  -fits engineering and design skills and resources  -production methods and skills well understood  **Marketing synergy**  -aimed at present customer types  -fits current distribution and sales resources  -uses current marketing research skills and resources  **Competitive advantage**  -opportunity to achieve technological leadership  -product is over of superior quality  -achieves a market advantage: first in market  **Expected performance**  **­**-product has high expected sales growth  -expected ROI or profit potential is high  -high expected market potential |
| [3] | Albar & Jetter (2013) | 52 projects |  | **Profitability**  -is the project expected to be profitable?  **Risk**  -How much uncertainty exists in bringing the project to the market?  **Product superiority**  -Does the product provide a unique advantage to the customer?  **Project feasibility**  -Does the project fit available resources?  **Market attractiveness**  -Is the market sufficiently large and will it grow further?  **Payback period**  -How long will it take to get the investment back?  **Competitive situation**  -How strong are current and future competitors? |
| [4] | Baker & Albaum (1986) | 76 fortune 500 companies | Questionnaire | **Societal Factor**  -Legality: product liability  -Safety: usage hazards  -Environment impact: pollution potential  -Societal impact: benefit to society  **Business Risk Factor**  -Functional feasibility: work as intended  -Production feasibility: technical feasible  -Stage of development: prototype development  -Investment costs: development costs  -Payback period: time to recover investment  -profitability: profit potential  -marketing research: necessary market information  -research and development: production development  **Demand Analysis**  **-**potential market: size of total market size  -potential sales: economies of sale  -trend of demand: growth of demand  -stability of demand: demand fluctuation  -product life cycle: expected length of cycle  -product line potential  **Market Acceptance Factor**  -compatibility  -learning  -need  -dependence  -visibility  -promotion  -distribution  -service  **Competitive Factor**  -appearance  -function  -durability  -price  -existing competition  -new competition  -protection |
| [5] | Brentani (1986) | 59 firms | Interview | **Financial potential**  **-**basic quantitative performance criteria, including expected market growth, sales growth, market share, profitability, and likelihood of success  **Corporate synergy**  -a new product that fits the firm’s current business, its organization, and its managerial skills. Of particular importance is marketing synergy, that is, are current customers a potential market and can present distribution, selling, and research resources be used for launch purposes?  **Technological and production synergy**  -can the product de developed and produced using current engineering, design, and production skills and resources?  **Product Differential advantage**  **-**technological leadership achievable through revolutionary innovations or the innovative application of a different technology resulting from a strong in-house new product program  -market dominance achievable through strongly differentiated and clearly superior product offering. |
| [6] | Hughes (1996) | 3 Pilot Projects |  | **Market Value Screen**  -understanding user needs  -competitive analysis  -externalities, the economy, demography, regulations, etc.  **Business Value Screen**  **-**economic factors  -strategic alignment  -organization endorsement  **Winning Solution Screen**  **-**solution positioning-benefits  -solution positioning-segments  -solution implementation  **Project/Process Planning Screen**  **-**risk and trade-off assessment  -organization support/competency  -internal cultural readiness |
| [7] | Magnusson, Wästlund & Netz (2016) | 100 ideas |  | **Originality**  **User value**  **Producibility** |
| [8] | Kelly & Storey (2000) | 43 firms | Questionnaire | **Financial implications**  **Market considerations**  **Specific management input**  **Strategic plans**  **Resource availability** |
| [9] | Onarheim (2012) | 99 ideas | Survey | **Visual**  **Textual**  **Benefit complexity** |
| [10] | Soukhoroukova, Spann, Skiera (2011) | 500 high-tech business to business company across 17 countries | Online questionnaire | **Acceptance of idea market**  **Quality of idea sourcing and filtering**  **Quality of idea evaluation**  **Overall performance of idea market** |
| [11] | Gutierrez, Kihlander, & Erikson (2009) | 3 companies | Interview | **Core competence**  **Market position**  **Component financial value**  **Development financing**  **Awareness of risk**  **Contribution to organizational goals** |
| [12] | Huang (2002) | 276 SMEs | Questionnaire | **R&D skills**  **Engineering skills**  **R&D resources**  **Engineering resources**  **Manufacturing resources**  **Marketing research skills**  **Salesforce skills**  **Distribution skills**  **Advertising/promotion skills**  **Marketing research resources**  **Salesforce resources**  **Distribution resources**  **Advertising/promotion resources**  **Financial resources** |
| [13] | Mu, Peng, & Tan (2007) | 74 firms | Interviews and surveys | **Technological**  **Marketing**  **Commercial**  **Managerial** |
| [14] | Ledwith & Perks (2011) | 70 SMEs and 74 large companies | Questionnaire | **Strategy**  **Research**  **Commercialization**  **Project climate**  **Process**  **Company culture**  **Metrics and performance evaluation** |

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