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Operational performance measures for startups
Nopadol Rompho,

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Operational performance measures for startups

Abstract

Purpose: The objective of this study is to investigate the uses of performance measures in startup firms including perceived importance and performance of those measures.

Design/methodology/approach: The survey method is used in this study. Data were collected from founders/CEOs/managers of 110 startups in Thailand. The correlation analysis and ANOVA techniques are used as the analysis tool in this study.

Findings: The results show that there is a positive relationship between the perceived importance and the performance of each metric. However, no significant differences are found in the importance and performance of each metric among the various stages of startups.

Research limitations/implications: Because there are so few startups compared to large corporations, the sample size of this study is relatively small, which is a limitation for some statistical tests.

Practical implications: Startup should measure and monitor the correct metrics in a particular stage, instead of trying to perform well in all areas, which will lead them to lose focus, and possibly even fail. Results obtained from this study will aid startups in properly monitoring and managing their performance.

Originality/value: Unlike large corporations, the performance measures used by startups vary, and depend on a startup's stage and type. Due to the fact that there are much fewer startups than large corporations, there are limited number of studies in this area. This research is among the first studies that try to investigate the uses of performance measure for this new type of organizations.

Keywords: Performance Measures, Metrics, Startup

Classifications: Research paper

Introduction

A startup is the pursuit of an opportunity without currently controlled resources (Stevenson *et al.*, 1994), and includes several definitions. Blank and Dorf (2012) define a startup as a temporary organization in search of a scalable, repeatable, and profitable business model. Alternatively, Ripsas and Troger (2014) define a startup as a young company, less than 10 years old, with an innovative business model and/or innovative technologies, and that demonstrates significant growth in the number of employees and/or in turnover.

Startups are the result of entrepreneurial activity (Ripsas *et al.*, 2015). Modern startups do more than just seize opportunities, because they also create opportunities themselves (Stevenson *et al.*, 1994). Entrepreneurship can be defined as the process of

developing an innovative and value-creating business model, starting and leading a company to serve customers and users with new products or services, and changing the way companies and people work and live (Faltin and Ripsas, 2011). Startups also need innovation in order to survive. Business model innovation that requires effective management of the intellectual capital of a startup can also be a key to success since it can unleash value creation from the company (Elia *et al.*, 2017).

Startups differ from large corporations. Each possesses what the other lacks. For example, corporations have resources, scale, power, and the processes needed to efficiently operate a proven business model. Conversely, a startup has none of these, but typically has promising ideas, organizational agility, the willingness to take risks, and aspirations of rapid growth (Weiblen and Chesbrough, 2015).

The other difference between startups and large corporations is that for startups, there will be unused capacity in the earlier stages of the firm when the funding is usually tight. Although unused capacities are generally not desirable, firms build it to accommodate uncertainty and plan for potential growth (Balanchandran *et al.*, 2007). This excess capacity is particularly important for startups since, startups face a tremendous amount of uncertainties and, at the same time, aim for high growth. The inclusion of unused capacity certainly brings challenges to startups.

Because large corporations and startup ventures are different organizations, the tools applied to these two organizational types must also differ. An important management tool used in organizations is the management accounting system, and many organizations have implemented the management accounting system in order to better understand the firm's performance. It is used to evaluate the effectiveness and efficiency of services or products, and to highlight strengths and areas for improvement in business processes. Startup ventures are no exception.

Davila and Foster (2005) argued that adopting a management accounting system is an important event for a startup. Their study, based on results from 78 startup companies, found that proxies for agency cost, perceived benefits and costs, company scale, and top management style can be used to explain differences in the time-to-adoption of budgets, which is an important management accounting system. Granlund and Taipaleenmaki (2005) studied the role of management accounting in startups and found that these new economy firms face fast growth and external influences from venture capitalists; thus, they use this system differently from traditional firms.

Sandino (2005) also found that early-stage firms use two sets of systems: basic management control systems, which include budgets, pricing systems, and inventory control, and systems that will reflect their strategy. For example, companies that emphasize cost leadership strategy are more likely to use systems that focus on operating efficiencies, while those that emphasize product differentiation strategy are more likely to use nonfinancial information in response to their customers. Moores and Yuen (2001) confirmed that management accounting systems are not used extensively in the early stages of companies, and factors that can affect the adoption of a management control system in startups include the presence of venture capital, company size, and founder replacement as CEO (Davila, 2005).

The goal of a management accounting system is to reduce agency cost and facilitate decision making (Baiman, 1982). In order to achieve these goals, performance measures are used as the main tools. These performance measures are market-based (Sloan, 1993) and nonfinancial (Ittner *et al.*, 1997). Although many studies on performance measurement exist, most focus on large organizations. The existing performance measures, although widely known in large corporations, might not apply to startup companies, which focused more on short-term rather than long-term planning. Consequently, this research aims to investigate how startup companies use performance measures to help understand and improve their operations. It also includes the study of the performance and perceived importance of those measures in various stages of a startup.

Performance measures in startups

Performance measurement is now garnering much attention, and interest in this topic continues to increase (Taticchi, 2008). This tool helps firms improve their business performance (Sharma *et al.*, 2005). However although there is extensive research that investigates the need of performance measurement in large corporations, literature related to its uses in small organizations, though existing, is still very limited (Hudson *et al.*, 2000).

Taticchi *et al.* (2010) argued that research on performance measurement in relation to small and medium-sized enterprises (SMEs) takes two directions. The first is the application and adaptation to the models developed for large corporations. The second is the development of specific models for SMEs. The performance measurement framework developed for SMEs includes models related to quality management in SMEs (McAdam, 2000; Noci, 1995), adaption of the Balanced Scorecard for SMEs (Chee *et al.*, 1997; Manville, 2007), activity-based costing in SMEs (Gunasekaran *et al.*, 1999), and other performance measurement models developed for SMEs (e.g., Hudson *et al.*, 2001; Khan *et al.*, 2007; Kueng *et al.*, 2000; Kwaku and Satyendra, 1998; Laitinen, 2002; Marri *et al.*, 2000; Sharma *et al.*, 2005). Taticchi *et al.* (2008) also integrated these models into performance measurement and management framework for SMEs, which consisted of five main systems: performance, cost, capability evaluation, benchmarking, and planning systems. Normally, SMEs do not have well defined processes; hence, their value chain should be clearly identified. Then it can be evaluated by the performance system. In order to utilize information from the performance system, a company's capability should be identified. Then, SMEs should consider information from the cost system. Finally, all results should be benchmarked with top-performing firms and should be used in planning (Taticchi and Balachandran, 2008; Taticchi *et al.*, 2012).

Although a startup is a type of SME, its nature is quite different. It can be argued that SMEs are like large corporations on a smaller scale. Although their characteristics are not exactly the same, both types of organizations operate in more stable environments compared with startups. According to the contingency theory, there is no universally appropriate performance measurement system that can be applied to all types of organizations in all conditions (Wadongo and Abdel-Kader, 2014). The system should be adapted based on specific organizational and contextual factors (Otley, 1980; Rejc, 2004).

For startups, as venture capital is an important source of finance, this can be a major contingency factor that affects their performance measures. Venture capitalists may encourage the use of performance measures in startup firms to help reduce agency cost. These performance measures help control the founders/CEOs and management staff to ensure they act in accordance with the investors' interests. These performance measures also help startups' founders/CEOs and management staff to make the right decisions. They help startups learn by using correct information, a concept Simons (1995) called "interactive systems."

Identifying current and future successful ventures helps to further the understanding of the entrepreneurial process and to guide public policies to improve the success rate of startups (Fried and Tauer, 2015). However, startups are not all the same. Different types of startups use different metrics. Croll and Yoskovitz (2013) identified metrics used in six types of startups: e-commerce, software as a service (SaaS), mobile apps, media sites, user-generated content, and two-sided marketplaces (see Table 1).

Table 1 around here

Muntean *et al.* (2016) also studied the performance of e-commerce startups, and revealed several key performance indicators, such as the shopping cart dropout rate, average revenue per visitor, order conversion rate, average number of products in an order, and average value of an order. Other researchers have identified further important measures, including survival, employment growth, sales growth (Bruderl and Preisendorfer, 1998), growth (McKelvie and Wiklund, 2010), growth rate, sales volume, business stability, customer acceptance, overall satisfaction of the entrepreneur (Sebora *et al.*, 2009), employment growth, rate of return, productivity (Reid and Smith, 2000), employment created, profits, turnover, creation of financial assets (McCartan-Quinn and Carson, 2003), the annual rate of growth of the business in terms of sales turnover since startup (Basu, 1998), and profit (Fu *et al.*, 2002).

Ripsas *et al.* (2015) introduced a measurement tool called the startup cockpit. They show that there are three clusters of metrics relevant to startups: customer activity, the financial perspective, and the process (or efficiency) perspective. Customer activity helps startups to measure and understand how customers perceive the delivered benefit. The metrics in this cluster include customer satisfaction and recurring customers. The financial perspective is related to economic survival and profit. Measures in this category include liquidity, burn rate, margin analysis, and ROI. The process (or efficiency) perspective helps to improve efficiency. Indicators include the learning curve, customer lifetime value, and customer acquisition costs.

Based on literature reviews, it can be concluded that there are many measures available to startups. However, unlike large corporations, startups are temporary organizations with limited resources. This makes it difficult for them to measure and monitor all aspects of the business at the same time. Startup companies also face dynamic settings and thus need to update their information more frequently. The need for such updated information increases with the scale of the company (Moore and Yuen, 2001). As a startup begins to grow, it needs more information to make decisions. Consequently, it can be argued that in order to use time and resources effectively and efficiently, a startup should pay more attention to areas considered to be more important. As a result, it is expected that startups will perform better in areas that

management consider to be more important, and less so in others. This leads to the first hypothesis of this study.

H1: The perceived importance of the metrics used by a startup is positively correlated with its performance level.

In order to investigate the uses of performance measures in startups properly, the stage of the startup should first be identified. Ries (2011) defined three stages of startups: build, measure, and learn. In the early stages, successful startups complete the business model iteration loop until the learning and insight derived from customer feedback provides enough evidence that the business model is profitable and scalable (Ripsas *et al.*, 2015). Croll and Yoskovitz (2013) identified five main stages of startups: empathy, stickiness, virality, revenue, and scale. Empathy is the stage when real customers' needs, which are not being met, are identified. The stickiness stage starts when the startup knows how to meet these needs and to keep customers coming back. If customers are satisfied with the solution, they will recommend it to others. This is the virality stage. In this stage, startups grow substantially. Then, all startups need to begin earning revenue (revenue stage). In this stage, the startup begins to perform based on a sustainable and scalable business model. If everything goes to plan, the startup will enter the final stage, scalable, when it becomes a larger corporation and is no longer classified as a startup. Maurya (2016) argued that startups in the early stages typically rely on two measures of progress: how much work they are generating, and how much money they are making. However, traditional measures of progress are unhelpful because there may not be any revenue in these stages. Furthermore, monitoring using quantitative metrics does not automatically provide a solution. Even when startups are generating revenue, unless they can connect cause and effect, they cannot leverage the elements that are making it successful, which can easily lead to the business following the wrong path. Pirolo and Presutti (2011) also found that metrics such as social networks are important to startups' success. However, their impact depends on the stage of the startup. Since the nature of each stage is different, the importance and performance of metrics used in each stage should also be different. This leads to the second and third hypotheses in this study.

H2: Startups assign different levels of importance to performance measures, depending on their stage of growth.

H3: Startups perform differently, depending on their stage of growth.

Design/methodology/approach

This research adopts the survey method. Overall, 607 startup companies were found to exist in Thailand. The list of these companies was compiled using the Thailand Startups - AngelList, the extensive online database for startups in Thailand. Based on a preliminary exploration of each startup's website, it was found that only 292 startups are still in operation. The questionnaires were then distributed to the founders, CEOs, or senior managers in these startup companies. Respondents were asked to identify the type and stage of the startup, the level of importance of the performance measures they use, and to evaluate their performance for that indicator. The questionnaire uses a five-point rating scale, where 1 denotes the least importance/poorest performance and 5 is highest importance/best performance.

This list of startup metrics was gathered from the work of Croll and Yoskovitz (2013), because it is comprehensive and provides specific measures for each type of startup. It also covers all measures proposed in other studies. Nevertheless, to be certain that the list is comprehensive in the context of Thai startups, it was tested by interviewing startups of each type to determine whether they used any measures that did not appear in the list. The results of the interviews revealed that startups also track several financial measures: revenue, expenses, and profit. Thus, these three measures were added to the list of performance measures.

The data were extracted from the returned questionnaires, and analyzed using both descriptive and inferential statistics. A correlation analysis was performed to test the first hypothesis, while ANOVA tests were used to test the second and third hypotheses.

Findings

Of the 292 distributed questionnaires, 115 were returned. Thus, the response rate was 37.67%. Note that five startups did not identify their type and, thus, were eliminated from the study. The startups were distributed among the various startup types, with most being two-sided marketplaces (29.1%), followed by SaaS (28.2%), and e-commerce companies (22.7%); see Table 2.

Table 2 around here

The survey results revealed that 27.3% of the startups are in the revenue stage, where they begin to generate revenue, while 25.5% of the startups are in an early stage, where they are trying to find solutions that meet the market's needs. Table 3 shows how the startups are distributed among the various stages.

Table 3 around here

Different types of startups indicated different levels of importance/performance for the various measures used. Tables 4 and 5 show the importance/performance of each measure, based on the perceptions of the founder/CEO/senior management. The average importance/performance score for each measure is shown in parentheses.

Table 4 around here

Table 5 around here

Then, a correlation analysis revealed that the perceived importance of the performance measures is positively correlated with the performance level of the startups in the sample, overall. The correlation coefficient is 0.232, with p-value of 0.000. Thus, the first hypothesis is supported. However, when examining each type of startup, the relationship between the importance and the performance of each measure was found only for e-commerce, SaaS, and mobile app startups, but not for media sites, user-generated content, and two-sided marketplace startups. This indicates that the latter three types do not perform well in areas considered to be important. Table 6 shows the correlation coefficients and p-values for each startup type.

Table 6 around here

For the second and the third hypotheses, a statistical analysis was not possible for each measure in each stage, owing to the small size of the samples and the fact that each type of startup uses different measures. Thus, in order to test the second and third hypotheses, statistical analyses were performed only on measures used by all startups, namely revenue, expenses, and profit.

Somewhat surprisingly, the results revealed that the importance and the performance of these three metrics (profit, revenue, and expenses) are not statistically different among the various stages. Although the means of the importance and performance tend to be higher in the latter stages of growth (revenue and scalable), there is not sufficient evidence to suggest that this difference is statistically significant. Table 7 shows the means of the importance and performance for the profit, revenue, and expenses of each startup stage.

Table 7 around here

A further analysis was then performed to test whether this finding held for the remaining performance measures. Owing to the small sample sizes, as indicated earlier, this test was performed only for two types of startups, namely SaaS and two-sided marketplaces, because they provided the largest sample sizes. Once again, the results showed no statistical difference in the importance (with two exceptions) and the performance of each measure among the different stages. The first exception in importance is the stickiness measure, which is not important in the scalable stage for SaaS. The second is the conversion funnels measure, which is not as important in the empathy stage. No statistically significant differences were identified in terms of the performance of each measure.

Thus, the findings reject the second and third hypotheses. These results were somewhat surprising, because it was expected that each startup stage being different would mean their focus in terms of measures would vary. A possible explanation for the result is that although startups should pay more attention to particular measures in various stages, external pressure (e.g., from investors) might affect where they focus their attention. For example, although revenue, expenses, and profit should be more important in the latter stages, startups might need to report these measures to investors. Another possible explanation is that startups simply do not focus on measures that matter the most in each stage. This might not be a good sign, because trying to perform well in every area might lead to a loss of focus, and possibly failure, given the limited resources typically available to startups in each stage.

Conclusion

Unlike large corporations, startup companies are still searching for an appropriate business model. Thus, the performance measures used by startups vary and depend on a startup's stage and type. The findings show that some startup types (media site, user-generated content, and two-sided marketplace) demonstrate performance that is inconsistent with the importance of a measure, implying that the some startups perform well in less important areas, but poorly in areas that are more important.

It can be argued that startups can face four situations based on the importance and performance of each metric. First, when a metric is considered important and performance is excellent, it implies that startups are doing well in the important areas, and thus the startup's strategy should be to maintain this status. Second, if a metric is considered less important, but the startup is doing very well in this area, this is not a good sign, as many might believe. Rather, this shows that the startup is wasting its limited resources in an unimportant area. Resources should be reallocated to more important areas instead.

Third, when the performance of a startup is not very good in an unimportant area, the startup should not become anxious, as that area has low priority. Finally, if the startup is performing poorly in the most important areas, this is a red flag. It is of highest priority for a startup to improve its performance in this area. Thus, the results from this study can help startups allocate resources properly.

In addition, this study found no difference in the perceived importance and performance for each metric among the startup stages. This may be due to startups receiving pressure from outside, for example from investors, whose interests might differ to those of the startup in a particular stage. Hence, startups might need to report results, even though these results are not that important to the business in that stage. These conflicting interests might be a warning to startups, because if they do not measure and monitor the correct metrics in a particular stage, and instead try to perform well in all areas, they may lose focus, and possibly even fail.

It is also interesting to note that no startups in this study paid attention to unused capacity. Startups need to build up excess capacities at the beginning since they normally aim for a high rate of growth and demand is normally very uncertain. The metrics that can identify the unused capacities of a startup can be very useful for this type of organization (see for example the work of Balanchandran et al., 2007).

Based on the findings previously discussed, a startup should measure and monitor the correct metrics in a particular stage, instead of trying to perform well in all areas, which will lead them to lose focus, and possibly even fail. Results obtained from this study will aid startups in properly monitoring and managing their performance.

However, because there are so few startups compared to large corporations, the sample size of this study is relatively small, which is a limitation for some statistical tests. This might also explain why there are so few studies in this area. Nevertheless, the findings of this study will hopefully aid startups in properly monitoring and managing their performance.

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Table 1 Performance measures by type of startup

| E-commerce | SaaS | Mobile App |
|---|---|--|
| <ul style="list-style-type: none"> • Conversion rate • Purchases per year • Average shopping cart size • Abandonment • Cost of customer acquisition • Revenue per customer • Top keywords driving traffic to the site • Top search items • Effectiveness of recommendation engines • Virality • Mailing list effectiveness | <ul style="list-style-type: none"> • Attention • Enrollment • Stickiness • Conversion • Upselling • Cost of customer acquisition • Revenue per customer • Virality | <ul style="list-style-type: none"> • Downloads • Launch rate • Percentage of active users/players • Percentage of users who pay • Cost of customer acquisition • Customer lifetime value • Ratings click through • Virality • Time to first purchase • Monthly average revenue per user • Churn |
| Media Site | User-generated Content | Two-sided Marketplaces |
| <ul style="list-style-type: none"> • Ad inventory • Ad rates • Content/advertising balance • Audience and churn • Mailing list effectiveness | <ul style="list-style-type: none"> • No. of engaged visitors • Content creation • Engagement funnel changes • Value of creation content • Notification effectiveness • Content sharing and virality | <ul style="list-style-type: none"> • Buyers and sellers growth • Inventory growth • Search effectiveness • Conversion funnels • Rating and signs of fraud • Pricing metrics |

Table 2 Types of startups in the sample

| Type of startup | Frequency | Percent |
|------------------------------|------------------|----------------|
| E-commerce | 25 | 22.7 |
| Software as a Service (SaaS) | 31 | 28.2 |
| Mobile App | 12 | 10.9 |
| Media site | 2 | 1.8 |
| User-Generated Content | 8 | 7.3 |
| Two-sided Marketplaces | 32 | 29.1 |
| Total | 110 | 100.0 |

Table 3 Stages of startups in the sample

| Stage of startup | Frequency | Percent |
|-------------------------|------------------|----------------|
| Empathy | 28 | 25.5 |
| Stickiness | 25 | 22.7 |
| Virality | 17 | 15.5 |
| Revenue | 30 | 27.3 |
| Scalable | 10 | 9.1 |

| | | |
|-------|-----|-------|
| Total | 110 | 100.0 |
|-------|-----|-------|

Table 4 Importance score for each performance measure by type of startup, in descending order

| E-commerce | SaaS | Mobile App |
|--|---|--|
| <ul style="list-style-type: none"> • Conversion rate (4.50) • Purchases per year (4.40) • Average shopping cart size (4.40) • Revenue (4.40) • Revenue per customer (4.20) • Cost of customer acquisition (4.00) • Expenses (4.00) • Top search items (3.71) • Top keywords driving traffic to the site (3.70) • Abandonment (3.60) • Virality (3.60) • Mailing list effectiveness (3.40) • Profit (3.40) • Effectiveness of recommendation engines (3.18) | <ul style="list-style-type: none"> • Enrollment (4.06) • Conversion (4.06) • Stickiness (4.00) • Revenue (4.00) • Attention (3.94) • Revenue per customer (3.75) • Cost of customer acquisition (3.71) • Upselling (3.63) • Expenses (3.57) • Virality (3.35) • Profit (3.00) | <ul style="list-style-type: none"> • Percentage of active users/players (4.44) • Cost of customer acquisition (4.44) • Churn rate (4.44) • Expenses (4.11) • Virality (4.00) • Customer lifetime value (3.89) • Launch rate (3.67) • Downloads (3.56) • Revenue (3.33) • Ratings click through (3.22) • Monthly average revenue per user (3.22) • Time to first purchase (3.00) • Percentage of users who pay (2.89) • Profit (2.44) |
| Media Site | User-generated Content | Two-sided Marketplaces |
| <ul style="list-style-type: none"> • Ad rates (3.50) • Content/advertising balance (3.50) • Audience and churn (3.50) • Mailing list effectiveness (3.50) • Ad inventory (3.00) | <ul style="list-style-type: none"> • Content sharing and virality (4.00) • Revenue (3.75) • Expenses (3.75) • No. of engaged visitors (3.83) • Content creation (3.83) • Value of creation content (3.83) • Engagement funnel changes (3.67) • Notification effectiveness (3.67) • Profit (3.00) | <ul style="list-style-type: none"> • Buyers and sellers growth (4.52) • Revenue (4.24) • Conversion funnels (4.22) • Search effectiveness (4.09) • Rating and signs of fraud (3.87) • Expenses (3.81) • Pricing metrics (3.61) • Inventory growth (3.26) • Profit (2.95) |

Table 5 Performance score for each performance measure by type of startup, in descending order

| E-commerce | SaaS | Mobile App |
|--|---|--|
| <ul style="list-style-type: none"> • Conversion rate (4.00) • Abandonment (3.89) • Average shopping cart size (3.78) • Profit (3.70) • Top keywords driving traffic to the site (3.67) • Top search items (3.56) • Purchases per year (3.44) • Mailing list effectiveness (3.33) • Revenue (3.30) • Virality (3.00) • Expenses (2.70) • Cost of customer acquisition (2.67) • Effectiveness of recommendation engines (2.67) • Revenue per customer (2.56) | <ul style="list-style-type: none"> • Cost of customer acquisition (3.76) • Revenue per customer (3.53) • Profit (3.50) • Conversion (3.47) • Attention (3.41) • Expenses (3.29) • Enrollment (3.24) • Stickiness (3.18) • Virality (3.18) • Revenue (3.14) • Upselling (2.82) | <ul style="list-style-type: none"> • Downloads (3.70) • Expenses (3.56) • Launch rate (3.22) • Profit (3.11) • Customer lifetime value (3.00) • Virality (3.00) • Percentage of active users/players (2.89) • Churn rate (2.89) • Cost of customer acquisition (2.89) • Revenue (2.56) • Monthly average revenue per user (2.33) • Ratings click through (2.22) • Time to first purchase (2.22) • Percentage of users who pay (2.11) |
| Media Site | User-generated Content | Two-sided Marketplaces |
| <ul style="list-style-type: none"> • Audience and churn (3.50) • Mailing list effectiveness (3.50) • Ad rates (3.00) • Content/advertising balance (3.00) • Ad inventory (2.50) | <ul style="list-style-type: none"> • Content creation (4.00) • No. of engaged visitors (3.80) • Profit (3.75) • Value of creation content (3.67) • Content sharing and virality (3.50) • Engagement funnel changes (3.33) • Notification effectiveness (3.33) • Revenue (3.00) • Expenses (3.00) | <ul style="list-style-type: none"> • Buyers and sellers growth (3.83) • Profit (3.55) • Conversion funnels (3.39) • Pricing metrics (3.30) • Revenue (3.29) • Search effectiveness (3.13) • Rating and signs of fraud (2.87) • Expenses (2.86) • Inventory growth (2.83) |

Table 6 Correlation between importance and level of performance by startup type

| E-Commerce | SaaS | Mobile App | Media Site | User-generated Content | Two-sided Marketplaces |
|------------------------------|-----------------------------|------------------------------|----------------------------|-----------------------------|----------------------------|
| 0.382** (p-value = 0.000) | 0.203* (p-value = 0.023) | 0.265** (p-value = 0.000) | 0.606 (p-value = 0.063) | -0.247 (p-value = 0.197) | 0.117 (p-value = 0.417) |

**significant at 0.05 level **significant at 0.01 level*

Table 7 Means of the importance and performance of metrics by startup stage

| Stage of startup | Importance | | | Performance | | |
|------------------|------------|---------|----------|-------------|---------|----------|
| | Profit | Revenue | Expenses | Profit | Revenue | Expenses |
| Empathy | 3.75 | 4.15 | 3.62 | 2.69 | 2.77 | 3.00 |
| Stickiness | 2.79 | 3.57 | 3.79 | 2.64 | 2.86 | 2.86 |
| Virality | 3.83 | 4.08 | 4.17 | 2.67 | 2.75 | 3.00 |
| Revenue | 3.65 | 4.29 | 3.88 | 3.65 | 3.88 | 3.47 |
| Scalable | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 1.50 |
| Total | 3.51 | 4.03 | 3.83 | 2.97 | 3.12 | 3.05 |
| F-score | 2.110 | 0.939 | 1.163 | 1.296 | 1.612 | 1.726 |
| p-value | 0.093 | 0.449 | 0.338 | 0.283 | 0.185 | 0.158 |

Operational performance measures for startups

- Authors:** Dr. Nopadol Rompho
- Affiliation** Thammasat Business School and Center of Excellence in Operations and Information Management, Thammasat University
- Email** nopadol@tbs.tu.ac.th
- Brief Biography** Dr. Nopadol Rompho joined Thammasat Business School in 2003. His primary research interest is in the area of performance measurement and operations management. Before joining the university, he worked in oil and gas companies as an engineer and business analyst. He obtained a Bachelor's degree in Chemical Engineering (2nd Class Honors) from Chulalongkorn University, Thailand in 1995, Master of Science in Chemical Engineering from Oregon State University, US in 1997, Master of Business Administration from Thammasat University, Thailand in 2001, and Doctor of Philosophy from University of Glasgow, U.K. in 2006.
- Acknowledgement** The author received a research grant from Thammasat Business School, Thammasat University.
- Contact Address** Department of Operations Management, Faculty of Commerce and Accountancy, Thammasat University, 2 Prachan Rd. Bangkok 10200 Thailand.