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STARTUP PERFORMANCE INDICATORS IN A RESOURCE-CONSTRAINED ECONOMY: DESCRIPTIVE EVIDENCE FROM PAKISTANI TECHNOLOGY STARTUPS

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Abstract

Technology startups in emerging economies operate under resource constraints that make conventional financial performance indicators insufficient for capturing actual venture progress. This study investigates the startup performance indicators in the technology startup sector in Pakistan based on survey data of 252 startups' founders, co-founders, chief executive officers, and senior managers. The study design was quantitative, cross-sectional descriptive. The seven items perceptual scale (Cronbach's α = .89) was adopted from the previous studies on entrepreneurship to measure the startup performance, covering financial, market, innovation, customer, and operational aspects. The mean score for the construct was 4.68 with a SD of 0.960, representing a moderate to positive performance of the sample. Targeted revenue growth and financial performance relative to expectations were the highest rated indicators in item-level analysis, with all seven items above the neutral midpoint. The results support the idea of evaluating performance in resource-poor start-up contexts in various dimensions and offer guidance on actionable steps for founders, incubators, accelerators, and policymakers in evaluating early-stage technology ventures.

INTRODUCTION

Nowadays, technology start-ups are considered as the catalysts of innovation, digital transformation and job creation. Their significance can be particularly seen in emerging economies, where entrepreneurial activities are supposed to play a role in the economic renewal, technological upgrading, and creation of knowledge-oriented markets (Amini Sedeh et al., 2022; Chowdhury & Audretsch, 2024; Singh & Singh, 2024; Zaidi et al., 2021). However, the measurement of start-up performance is still a complex issue, especially for young technology companies in economies with immature financial markets, institutional support mechanisms, and innovation infrastructure. One of the major problems is that you can't measure performance with just one financial measure. Normally, mature firms are measured in terms of profitable, ROI or market share. But these indicators only partially capture the situation of early-stage startups, which can go through extended periods of product development, customer discovery, and market testing before they start to have stable financial results.

The structural features of emerging economies, such as weaker institutions – financial markets, credit markets, regulatory systems and innovation support infrastructure – make the performance measurement issues of technology start-up businesses even more problematic. In these settings, the startups are not only deprived of resources in the traditional sense, but they are also operating in what scholars have called institutional voids – voids where the intermediaries and regulations that firms operating in developed economies take for granted are missing (Mair & Marti, 2009; Tracey & Phillips, 2011). Such a void can change start-ups' growth paths in fundamental ways. For instance, a young tech start-up in Pakistan may not have access to the venture debt or formal angel networks, patent protection systems or market data to track, report and benchmark company performance. When institutional support is low, the events that are important to the firm's progress are different from those that are important to external financial signals: institutional development events like product iteration and customer validation are more important than traditional measures of performance.

Therefore, the financial figures of such ventures should not be compared, not only imprecise, but also theoretically inappropriate, with the financial figures of mature firms. It demonstrates a category error, that is, the application of measures developed for one type of organizational situation to another situation, in a naïve manner. In these stages, a venture could be making significant strides but not earning a lot of profit. This implies that startup performance is a multi-faceted concept which should include innovation, market and operational aspects. Multidimensional performance measurement has received a lot of attention in the management and entrepreneurship literature.

Earlier, Venkatraman and Ramanujam (1986) suggested that firm performance should not be viewed solely as financial results, but should also encompass operational and broader organizational aspects. Murphy et al. (1996) have also pointed out the limitation of the narrowness of the measures of performance in the field of entrepreneurship and the value of wider, better justified measures of performance. They are specially making the sole focus of profitability an incomplete measure of success relevant for startup research as the early success can take the form of new product development, customers, service improvements and market validation rather than profitability. The recent studies involving the use of wider performance measures for young and entrepreneurial firms are ongoing (Amini Sedeh et al., 2022; Mustafa et al., 2021; Pham & Nguyen, 2024; Wiklund & Shepherd, 2003; Yang et al., 2022). This is a problem especially in resource-poor economies. In such contexts, the availability of capital, formal support systems, knowledge networks, regulatory processes and market institutions are often weak, which is particularly difficult for startups (Armanios et al., 2017; Mair & Marti, 2009; Tracey & Phillips, 2011).

These structural conditions impact on the development of startups, as well as on the measurement of their success. In that kind of scenario, a young business might not have audited accounts, regular income statements or any sort of reporting systems, so profitability alone is an incomplete measure. There are practical implications to this measurement gap, beyond just academic debate. Limited financial tools are being used to assess the performance of ventures by ecosystem, investor communities and policy makers, and they are systematically misallocating the support. When a firm is actually growing – growing innovation capacity, growing number of customers, growing number of employees, setting up processes – it can be considered underperforming because it has failed to monetize the growth yet. Conversely, startups that have short-term revenues but have no bases to run their business and/or innovate may be overvalued.

In resource-limited societies, were already little support for startups, the consequences of misallocation can be significant. Incubators book cohort spots, accelerators give investment-readiness estimates and policymakers create incentive programs; they all rely implicitly or explicitly on some idea of what startup performance is. This understanding might be simplistic, and the entire support system might not be in line with the actual needs of the ventures it supports. Pakistan is a good case study for this measurement problem. Digitalization, incubation and policy focus have contributed to the technology start-up ecosystem in the country in the past 10 years. Startups are located in software development, e-commerce, financial technology (FinTech), education technology (EdTech), health technology (HealthTech), and artificial intelligence-related

services (AI Services) (Khursheed, 2024; Malik et al., 2025; Tang & Ali, 2024). But there are still structural limitations in the ecosystem. Many startups are small, young and self-financed or seed funded and the regular financial indicators are not sufficient to measure the performance of such a small business.

This study aims to fill this gap by analyzing the indicators of startups' performance in the technology startups sector in Pakistan. The study is based on a survey of 252 key informants in the key cities of Pakistan and adopts a multidimensional performance view, which includes financial, market, innovation, customer and operational indicators. The analysis is intentionally more descriptive than causal, and is meant to present empirical data regarding how startup performance should be thought of and measured in a resource-poor emerging economy. The study makes a contribution to the literature on start-up performance by providing empirically context-specific evidence from a country like Pakistan which has been under-researched in quantitative start-up performance studies and providing practical implications for start-up founders, incubators, accelerators, and policymakers.

The rest of the paper is organized as follows. The literature on startup performance measurement is reviewed in Section 2. The methodology is given in Section 3. The descriptive findings are reported in Section 4. Implications are discussed in Section 6 and the conclusion in Section 7.

2. Literature Review

2.1 Startup Performance as a Multidimensional Construct

Startup performance as a multidimensional construct. Startups are not old companies with well-defined routines, predictable revenue streams, or long financial histories, making the performance of startups a complex phenomenon. Unlike established companies, startups have a tendency to experiment, build products and validate customers, and learn from the market. In such an environment, profitability or revenues may not be the best indicator of performance. If the financial returns are not significant, a startup might be focused on building a customer base, improving its product, setting up internal operations, or securing market share. This multidimensional perspective is supported by the general management literature. According to Venkatraman and Ramanujam (1986), firm performance should be considered from multiple facets, financial performance and operational/organizational performance. This was corroborated by Murphy et al. (1996) who bemoaned the limited criteria of performance adopted in entrepreneurship studies. These fundamental arguments still hold true for startup research, because early-stage startups may not have audited statements, positive profitability or other financial histories.

In more recent times, researchers have also continued to promote multidimensional performance systems in start-up and entrepreneurial environments. Wiklund and Shepherd (2003) used more general performance measures in their research of entrepreneurial companies, recognizing that growth and development of young companies cannot be measured by a single financial measure. Amini Sedeh et al. (2022) pointed out the role of innovation outcomes in the performance of startups in emerging economies. Mustafa et al. (2021) supported the idea of composite performance indicators in the context of Pakistan entrepreneurship. Similarly, Yang et al., (2022) and Pham and Nguyen (2024) demonstrated that innovation, operational improvement, learning and capability development can be applied meaningfully to understand startup performance. All of these studies suggest that the measures of performance should be consistent with the developmental phase and context of the firm.

However, it is crucial to also note that the multidimensional nature of startup performance is not merely a methodological choice but a substantive theoretical one concerning the nature of startups and their development. The start-up companies do not compete like the established companies, but based on learning and adaptation and capability formation (Wiklund & Shepherd, 2003). It's possible that at a certain time, a startup's most valuable assets are intangible, visionary: a polished product idea, a validated customer base, a growing team that possesses the necessary skills, or a nascent idea about how to run an efficient business in a certain market. All are intangible and none of them are reflected in a balance sheet and profitability ratio. None of them are a real description of what a startup is doing when it's doing well, though. Not measuring these dimensions is like measuring a student's progress in learning based only on examination results, without taking into account the analytical and critical thinking skills and how the student applies their knowledge – which is only partially reflected in any one examination. The concept is that a startup's performance should be measured on a theoretical basis of what startups do, not from a performance measurement scheme that is copy pasted from that of a more established business. In the case of technology startups, financial results are not enough, as other factors such as the ability to bring new products or services to market, customer acquisition and retention, internal process enhancements and market positioning are all considered. The current study takes a view on start-up performance as a multi-dimensional phenomenon as described in the literature in the field of entrepreneurship, which includes financial, market, innovation, customer and operational indicators.

2.2 Startup Performance in Resource-Constrained Economies

In resource constrained economies, it is more challenging to measure performance, as startups face structural conditions affecting their growth trajectories and capacity to report performance. The typical characteristics of emerging economy startups are limited access to finance, underdeveloped support institutions, weak knowledge networks, regulatory uncertainty and unstable market conditions (Armanios et al., 2017; Mair & Marti, 2009; Tracey & Phillips, 2011).

These conditions not only limit startups' resources, but they also shape the type of startup progress over time. In such environments, profitability can be very slow, as startups might have to wait to be profitable, to survive, to validate their product, and to gain access to the market. If a young tech start-up is making progress in product development, acquiring customers, entering new markets, hiring new employees, or growing its business operation, it's doing pretty well. But if only financial profit is used to measure performance, this progress may not be evident and thus a measurement problem arises, which can systematically underestimate entrepreneurial development in resource-poor environments.

Such a mistake has structural implications for the design and assessment of start-up ecosystems. If the main signal that support institutions such as incubators, accelerators, government schemes and investors use to decide who gets in and out of their programmes is financial return, then selection and graduation criteria of support institutions are implicitly biased towards startups that have already begun earning revenues, rather than towards those that are developing the fundamental capabilities that allow them to grow sustainably over time. This is a double disadvantage in a resource constrained country like Pakistan, where even formal financing is linked to financial performance and measured in terms of profitability, and startups that are high on innovation, market development or operational capability, but are not yet profitable, are less likely to get formal financing and more likely to be judged as failures. Thus, the measurement issue is not purely theoretical but one which influences the actual allocation of resources in the ecosystem and what companies will be able to survive to achieve financial maturity. An incentive structure that is more contextually relevant and inclusive will not only help to better understand academic performance of startups; it will also start to recalibrate the incentive structures of the startup ecosystem itself and begin to focus support on those startups that are truly poised to develop, not those that are simply ready to be bought up.

Subjective performance measures are also more appropriate in start-up research, considering limited resources. Many startups don't have formal records that have been audited, and even if they do, they may not be comparable between firms due to different ages, business models, funding stages, and growth strategies. The perceptions of the founder and senior managers can therefore be

useful indicators of progress in the firm, especially if the informants are directly concerned with the strategy and operations and market development. Although subjective measures can be problematic, they may be necessary and methodologically suitable in research on entrepreneurship in situations where objective financial data may be unavailable or unreliable (Pham & Nguyen, 2024; Yang et al., 2022).

It is also worth noting that in the use of perceptual performance measures, this is not just a pragmatic choice in the absence of other data but also has a theoretical basis. It is the entrepreneur or senior management of the startup company that understands the strategic position and direction of their own company. They have product development, customer, team and operations information that is not captured in any external financial statement and likely won't appear in the external financial statement for several years. In this sense, perceptual measures provide a more rich and more-timely source of insider information than do financial measures taken in hindsight. This argument is in line with the resource-based view of the firm which suggests that the competitive advantage of a firm is dependent on the resources and knowledge that the firm has, and these are not easily identifiable from outside the firm (Wiklund & Shepherd, 2003). When it comes to understanding how a startup is doing, if the most important information is in its founders' heads, then the most direct way to get that information is to ask the founders. Therefore, it is necessary to have context-sensitive knowledge of performance. In a resource constrained economy, the success of startups should not only be measured in terms of financial returns, but also in terms of innovation products, market access and operational capacity. While financial indicators remain valid, they need to be analyzed in combination with other indicators reflecting the actual development stage of the start-up.

2.3 Pakistani Technology Startup Context

Pakistan offers a valuable context for the analysis of startup performance indicators as the technology startup ecosystem in the country has grown considerably over the past few years and still has structural constraints. The startups in the ecosystem are involved in information technology, software development, ecommerce, financial technology, edtech, health tech and artificial intelligence related services. The visibility of the startup sector of Pakistan (Khursheed, 2024; Tang & Ali, 2024) has grown due to policy attention, incubation support, and digitalization. From the literature available on the technology and entrepreneurial environment in Pakistan, it is concluded that there are some non-financial factors affecting start-ups. Zaidi et al., (2021) highlighted the need for ecosystem support and managerial competence in the development of startups. Khursheed (2024) demonstrated that the results of innovation in Pakistani technology startups are influenced by knowledge base and resource

configuration. Malik et al. (2025) showed that learning behavior and network-based development of technology startup founders was very important. Tang and Ali (2024) connected the factors of innovation ecosystem with performance related outcomes in the technology sector of Pakistan.

These studies validate that success of startups in Pakistan is linked to knowledge, learning, capability building and participation in the ecosystem, and not just funding. This can be easily understood when one considers the funding environment of tech-startups in Pakistan. In the absence of these, the vast majority of active startups in the ecosystem are being self-funded and are in seed stage, and therefore do not receive the signals of performance - term sheets, institutional investors, revenue covenants - that are de facto in more developed startup ecosystems. Series A funding round is an indicator of Silicon Valley or London's confidence in a venture's direction. In Pakistan, most startups will never get this kind of outside validation, not necessarily because they are not doing well, but because the institutional setup to support such transactions is not well developed. This further highlights the need to have internal, multidimensional performance measurement systems, which are not reliant on external market signals to convey venture progress.

The startups, their founders, mentors and any supporting institution should have a mechanism to monitor the developmental process with tangible internal indicators – innovation activities, customer acquisition, operational growth, and team development – as opposed to monetary indicators, which may only come at the end of the day in the context of the Pakistani ecosystem. But, the performance in a start-up context is not well researched. Performance is used as an outcome variable in many studies, but the meaning of performance for young technology start-ups with scarce resources is not explained. This is a huge miss because the success of a startup is very much dependent on the metrics used. If only profitability or sales revenue is emphasized, the contribution of startups in the building of innovation capacity, customer acceptance, market presence and operational systems can be systematically undervalued. The descriptive profile of Pakistani technology startups further highlights the need for more holistic performance measures. The majority of the startups in the sector are small or micro enterprises, under 6 years old, and depend on self-financing or seed funding. In this context, innovation, market and operational indicators are more appropriate to measure the progress of startups than only financial indicators.

2.4 Focus of the Present Study

The literature has determined that startup performance is a multi-dimensional phenomenon especially in early stage and resource-poor environments. Though there is a lot of theoretical research on the topic of broader performance measurement, there is little empirical research on the application of broader performance measures

to the Pakistani technology startups. Hence, the present study is an attempt to provide the descriptive empirical evidence on the indicators of start-up performance in a multi-dimensional perspective. In doing so, it provides a context-sensitive description of how startups are evaluated in an emerging economy where financial measures are not necessarily the best measure of venture progress. Firstly, this is a descriptive contribution and secondly it has two things going for it.

Firstly, it fills a gap in the literature on entrepreneurship construct in Pakistan, as existing literature has investigated the development of startups within an ecosystem (Khursheed, 2024), learning behaviour (Malik et al., 2025), knowledge management (Tang & Ali, 2024), and innovation activity (Zaidi et al., 2021), but there has been no systematic investigation of the construct of performance itself. Most of the literature available takes performance as the dependent variable and omits the consideration of the appropriateness of the indicators for the empirical context. This study does this on the contrary, and puts performance measurement itself at the heart of the analysis. Second, it provides a scientifically valid understanding of start-up performance that can be used as a model for future quantitative studies in the technology sector in Pakistan. Since there are no such benchmarks, causal models in this domain are vulnerable to the possibility that they are being constructed based on a measure that is theoretically inappropriate for the domain in which it is being used.

3. Methodology

A cross-sectional survey design was used in this study to explore the performance indicators of startups in the technology startup sector in Pakistan. The paper is descriptive, and the analysis is restricted to the firm profile and the extent of startup performance in terms of several dimensions. No causal model is estimated and no inferential testing is done. The design is appropriate for the purpose of this study, which is to present empirical evidence on the assessment of the performance of startups in the context of a resource constrained emerging economy. The empirical context is a technology start-up ecosystem in Pakistan. A total of 400 structured questionnaires were sent to technology startups of major cities of Pakistan including Lahore, Karachi, Islamabad, Peshawar, Faisalabad, Multan, Rawalpindi, Sialkot and Quetta. The founders, co-founders, chief executive officers and senior managers were identified as key informants and a purposive sampling was used for the distribution. This was done because these respondents are directly involved in the strategic and operational development of their firms, and they have the most accurate overall knowledge of product development, market progress and operational growth. A total of 271 questionnaires were returned out of 400 that were sent. A total of 19 returns were not used due to an excessive number

of missing values, straight-line responding, or because the role of the respondent was not eligible. A usable response rate of 63.0% was achieved, with 252 technology startups being the final usable sample. The subjective perceptual measure of startup performance was based on a seven item scale adapted from previous studies on entrepreneurship (Covin and Slevin 1989; Wiklund and Shepherd 2003). Each item was measured using a seven point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). This scale assessed various aspects of start-up performance, such as financial, market, innovation, customer and operational. Examples of these were revenue growth, improvement of market share, financial performance against expectations, new product or service launch, customer satisfaction, employee growth and performance against other startups in the same industry. Cronbach's alpha was used to check the internal consistency of the startup performance scale, which was good (α = .89) (Hair et al., 2019; Nunnally, 1978). There are two reasons why perceptual performance indicators are suitable in this context. One of them is that many startups in the early stages don't have audited financial statements or standardized performance records. Second, financial metrics can be misleading in assessing the growth of young technology companies that are still in the process of developing products, gaining customers, enhancing their internal resources, and positioning themselves in the market. Hence, performance metrics derived from the founder's or senior manager's report provide a context-sensitive and practical measure to track progress in startups in resource-constrained settings.

Only descriptive statistics were used to analyze the data. Frequencies and percentages were used for summarizing the firm profile. Means, standard deviations, skewness, kurtosis and ranges for the Startup Performance construct and items. The limited analytical framework was intentionally selected to keep the focus of this paper on the measurement of performance and not causal explanation.

4. Results

4.1 Response Screening and Usable Sample

Of the 400 questionnaires distributed, 271 were returned. Of the 27 responses, 19 were excluded after screening for the following reasons: 11 respondents had more than 10% missing data, 5 had straight-line response patterns, and 3 had ineligible respondent roles. A total of 252 technology startups were used for the final usable sample.

Table 1

Response Screening Summary

Response Category	Frequency

Response Category	Frequency
Questionnaires distributed	400
Responses returned	271
Excluded responses	19
Final usable responses	252
Usable response rate	63.0%

Table 2

Reasons for Excluding Responses

Reason for Exclusion	Frequency
More than 10% missing values	11
Straight-line response pattern	5
Ineligible respondent role	3
Total excluded	19

4.2 Profile of Sampled Startups

The sample was a reflection of the resource constrained nature of the technology start-up ecosystem in Pakistan. The majority of the companies were young, small and relied on limited sources of funding. Micro and small startups combined made up 79.7% of the usable sample. In terms of age, 74.2% of startups were less than six years old. Funding patterns were also indicative of resource constraints, with self-funded and seed-funded startups accounting for 66.3% of the sample. Lahore (30.6%), Karachi (28.2%) and Islamabad (25.0%) had the highest city shares. The top three sectors were IT and software development (29.0%), financial technology (19.4%) and e-commerce and digital marketplaces (19.4%).

Table 3

Profile of Sampled Technology Startups

Characteristic	Category	Frequency	Percentage
Founder experience	Less than 2 years	41	16.3

Characteristic	Category	Frequency	Percentage
	2 to 5 years	81	32.1
	5 to 10 years	69	27.4
	More than 10 years	61	24.2
Company size	1–10 employees (Micro)	86	34.1
	11–50 employees (Small)	115	45.6
	51–100 employees (Medium)	33	13.1
	More than 100 employees (Large)	18	7.1
Location	Lahore	77	30.6
	Karachi	71	28.2
	Islamabad	63	25.0
	Peshawar	22	8.7
	Faisalabad	7	2.8
	Multan	7	2.8
	Rawalpindi	3	1.2
	Sialkot	1	0.4
	Quetta	1	0.4
Industry	IT and software development	73	29.0
	FinTech	49	19.4
	E-commerce and digital marketplaces	49	19.4
	AI and machine learning	31	12.3
	Other	18	7.1
	EdTech	17	6.7
	HealthTech and MedTech	15	6.0

Characteristic	Category	Frequency	Percentage
Funding stage	Self-funded	102	40.5
	Seed-funded	65	25.8
	Angel investment	42	16.7
	Venture capital-backed	37	14.7
	Other	6	2.4
Firm age	0 to 3 years	71	28.2
	3 to 6 years	116	46.0
	6 to 10 years	65	25.8
Annual revenue	Less than PKR 1 million	90	35.7
	PKR 1 million to PKR 5 million	85	33.7
	PKR 5 million to PKR 10 million	41	16.3
	More than PKR 10 million	36	14.3

4.3 Descriptive Statistics of Startup Performance

Seven indicators were used to measure startup performance. The mean for the overall construct was 4.68 (SD = 0.960) on a seven-point scale, which is higher than the neutral point of 4.0, indicating that the perceived performance of the sample was moderate to positive. The range observed was 2-7, which shows that there was a variation in the perceived performance. The skewness (−0.02) and kurtosis (−0.01) values showed that the distribution was close to normal and symmetric. The internal consistency was acceptable (Cronbach's α = .89).

Table 4

Construct-Level Descriptive Statistics for Startup Performance

Construct	Items	N	Mean	SD	Skewness	Kurtosis	Range	α
Startup performance	7	252	4.68	0.960	−0.02	−0.01	2–7	.89

In terms of items, the highest mean values were reported for the items targeted revenue growth (M = 4.77) and financial performance relative to expectations (M = 4.77), followed by performance relative to other startups in the same industry (M = 4.71) and employee growth (M = 4.69). The relatively lower but still positive indicators were successful launch of new products/services (M = 4.58) and customer satisfaction (M = 4.55), while market share improvement was above the midpoint (M = 4.66). Respondents felt positive about progress in all seven indicators, which were all above the neutral midpoint.

Table 5

Item-Level Descriptive Statistics for Startup Performance Indicators

Code	Startup Performance Indicator	Mean	SD
SP1	Targeted revenue growth over the past three years	4.77	0.98
SP2	Improved market share relative to key competitors	4.66	0.98
SP3	Financial performance meets or exceeds expectations	4.77	0.95
SP4	Successfully launched new products or services	4.58	0.90
SP5	Customer satisfaction with products or services	4.55	0.95
SP6	Employee growth over the past three years	4.69	0.94
SP7	Performance relative to other startups in same industry	4.71	1.01

4.4 Interpretation of the Descriptive Findings

The descriptive findings were analyzed and interpreted. The descriptive results support the argument that the performance of startups in resource poor environments should be considered in a multi-dimensional manner. As shown in the sample profile, most of the firms were young, micro or small and self or seed funded, meaning that many were not at a mature stage in their organizational or financial development. In such cases, it is not advisable to use just one financial measure to evaluate performance. The results at item level show that all the indicators (financial, market, innovation, customer and operational) contributed to the overall profile. Mean values were most positive for revenue growth and financial expectations, but also for product or service launch, customer satisfaction, improvement of market share and employee growth were positive and above the neutral midpoint. The trend shows that startups sampled were not just reporting financial improvement, they were improving on a range of dimensions simultaneously. Practically, it can contribute to the implementation of multidimensional and balanced performance assessment systems in support and evaluation of startups.

5. Discussion

This study makes a theoretical contribution at the intersection of startup performance measurement and institutional context in emerging economies. In theory, the central argument put forth, that startup performance in resource constrained environments is a multi-dimensional phenomenon that can't be fully captured by economic metrics, is not new. Decades ago, Venkatraman and Ramanujam (1986) and Murphy et al. (1996) defined this stance at the general level of theory of firm performance. The present study contributes by providing empirical evidence for this argument in a particular and under-researched context: early-stage technology startups in the institutional voids and resource scarcity of an emerging economy like Pakistan. The contribution is not just confirmatory, thus. It illustrates that the need for multidimensional performance measurement is not eased, but exacerbated, by tighter institutional settings. The external market signals (valuations, funding rounds, sector benchmarks) in advanced economies partially make up for the shortcomings of any one internal measure of performance. In the world of technology startups in Pakistan, those rewarding signals are quite missing. The multidimensional performance framework is thus not an alternative to other approaches to measurement, but the only theoretically defensible approach to measurement in the empirical context. The study offers descriptive evidence that sampled startups reported significant advances in financial, market, innovation, customer, and operational dimensions at the same time and thus sets an empirical foundation for future causal and comparative studies in this field. It also provides a context-sensitive measurement rationale for

researchers addressing similar emerging economy contexts with weak institutional infrastructure and unreliable financial data, when designing performance measurement in studies of startups. This study was done in technology start-up sector of Pakistan using descriptive and multidimensional approach in order to know the indicators of start-up performance. The findings show that the sampled startups' performance was moderate to good; that is, they had a mean score that was above the neutral on the seven-point scale. This is an important discovery because the sample is made up of a large percentage of young, micro/small and self/seed funded companies. In this context, the performance of startups can't be taken as a measure of financial maturity, but rather as a combination of financial maturity, market maturity, innovation activity, customer response and operational growth.

The results have implications in the multidimensional performance literature both theoretically and practically. Venkatraman and Ramanujam (1986) have shown that the firm's performance is constitutionally multi-layered; that is, it is split between financial and operational and organizational aspects. Murphy et al. (1996) took this one step further and proposed that the systematic bias of performance measurement in entrepreneurship research is not desirable and that the use of a single indicator in entrepreneurship research is problematic because it may raise construct validity concerns that may impact the interpretive value of the research. The current study provides empirical evidence for both these arguments, in a context where they are especially compelling, that of technology start-ups in Pakistan.

The findings revealed that sampled startups had positive results in all seven performance measures, not just financial measures, but other non-financial measures such as customer satisfaction, product launch, and market share improvement. This is not only in line with the multidimensional theory, but it also demonstrates that a study that only examined financial indicators would have presented only a partial and perhaps misleading picture of venture development. Entrepreneurial activity is about building capabilities – and those building capabilities are startups that are innovating, acquiring customers, building their teams – even if they are not doing that to generate profits. The measurement system has to provide visibility into what is really going on in the firm, rather than what will show up on the financial statements.

The results at item level provide additional insight. The mean values for targeted revenue growth and financial performance relative to expectations were highest, followed by relative industry performance, employee growth and market share improvement. This trend indicated that founders and senior managers believed that they were making progress in other developmental areas as well as financial progress. While the least rated of the seven items, product launch and customer satisfaction are still

above the midpoint, suggesting that sampled startups were making progress on multiple dimensions, not just financial. The implications of the discovery in the practical world are applicable to startup ecosystems where balanced evaluation can assist in identifying a maturing venture before the financial maturation.This aspect requires more theoretical development. The trajectory of this item-level data (financial measures are highest, and non-financial measures are always above the neutral point) conceptually reflects the stages of growth experienced by startups. In the early stage, the typical evolution of a company is sequential, recognizing an opportunity, developing a product, testing the market and scaling up (Wiklund & Shepherd, 2003). The most prominent measures of progress vary at each stage: For early-stage ventures, innovation activity and product development are paramount, while once market entry has been achieved, customer acquisition and satisfaction become focal points, and once market position is established, financial measures start to become important and show the impact of the earlier non-financial investments. In this reading, the relative dominance of the sampled startups (which are young, small and resource constrained) in performance on financial indicators over innovation and customer indicators is not necessarily a good thing. It can be a signal that some founders have overly rosy expectations of their financial path prior to a solid foundation of innovation and customer validation, which is a known predictor of startup failures. While this interpretive possibility clearly cannot be determined by descriptive data alone, it does indicate a fruitful avenue for future research: longitudinal analysis to determine if this pattern of performance across dimensions in the early stages is related to long term venture survival and growth. The findings are particularly relevant for the tech start-up industry in Pakistan. Existing literature on the entrepreneurial environment in Pakistan underscores the role of the entrepreneurial ecosystem, digitalization, learning behavior, and resource constraints in shaping the success of startups (Khursheed, 2024; Malik et al., 2025; Tang & Ali, 2024; Zaidi et al., 2021). The present study contributes to this stream by specifically looking at performance indicators. It shows that the criteria for judging startups in Pakistan cannot be limited to profitability, revenue or investment raised. Rather, market, innovation, customer and operational metrics should be considered in addition to financial metrics to get a fuller picture of startup progress.

This discovery is related to a more general theoretical debate on how institutions and performance measurement are linked. In more developed economies, there is a thick external environment that continuously communicates to startups whether they are doing better or worse than their peers and expectations, through market institutions like competitive benchmarking systems, venture capital valuation norms, public

reporting requirements, and sector performance indices. In these environments, financial performance measures are backed and enhanced by a data ecosystem for comparison. There is a lack of such infrastructure in the technology startups ecosystem of Pakistan for external benchmarking. A lack of widely published sector performance indices, limited comparative data on startup financial trajectories, and a lack of institutional benchmarks to check against means there's no way for a founder to determine if their revenue growth rate is strong, adequate or concerning versus peers. In this data vacuum, the subjective perceptual measures used in the present study are not merely a data collection convenience, but rather are the only available signal of performance in the absence of institutional infrastructure to provide external calibration.

This suggests that performance measurement in startups in emerging economies is a matter of institutions as well, both in terms of the data available, and in terms of the norms of evaluation that have been established by the economy. A better performance benchmarking system in the Pakistani start-up ecosystem, either via incubator reporting system or government data collection or industry association benchmarks, would not only improve the quality of academic research, but also provide comparative data, which is currently lacking, to the founders, investors and policymakers. The study for researchers confirms the importance of choosing performance measures to be appropriate for the empirical context. In a startup, where resources are scarce, it's possible to have partial or inaccurate outcomes based on narrow financial metrics. From a profit standpoint, a startup company that is growing its market share, bringing on new products, pleasing customers, or hiring new employees may appear to be weak. Research on startups in emerging economies should therefore be careful in selecting the performance indicators and should not assume financial performance as the sole indicator of successful startups.

The results imply that founders should pay attention to a wider range of performance measures for practitioners. Financial performance is important but should be looked at along with customer satisfaction, product/service development, market share, employee growth, and comparative industry performance. This way, founders can determine if their business is on track even if it's not profitable yet. Especially in a resource constrained environment for early stage tech startups. This implication for founders is also related to the larger question of entrepreneurial cognition, and decision making in situations of uncertainty.

For founders in resource-constrained environments, there is a "double burden": they have to cope with the operational requirements of building a startup and they have to deal with the institutional uncertainty of operating in an environment with weak support structures

(Armanios et al., 2017; Mair & Marti, 2009). In this context, the clear and multi-dimensional understanding of their own company's performance can be regarded as not only a reporting convenience but also a cognition tool which will enable them to better evaluate the performance of their company. If founders only pay attention to their cash flow, they might get a false sense of the good health of their business when the cash flow is good but the innovation pipeline is weak, or vice versa. Thus, a balanced application of the multidimensional framework of performance monitoring confirmed in the present study can be regarded as part of the entrepreneurial effectiveness in the resource-poor context by expanding the information base on which to base decision-making and improving the quality of decision-making. The results show that there is a need for stage-specific evaluation systems for incubators, accelerators, and policymakers. Start-up support programmes, which are geared towards financial results, may be missing out on start-ups with high innovation potential, customer acceptance or operational bases. A more holistic performance system can be adopted to recognize start-ups that have developmental potential even before they are financially ready. The results have implications for the broader entrepreneurial support architecture in Pakistan, particularly for policymakers, who are involved in the evaluation of startups. In recent years, the State Bank of Pakistan, Securities and Exchange Commission, and provincial innovation authorities have shown greater interest in the startup scene, with a focus on regulatory adjustments and support initiatives to foster its growth (Tang & Ali, 2024). But if the criteria used to evaluate eligibility for support in these programs are mostly based on financial signals, they may systematically exclude the majority of the ecosystem — small and young, self-funded startups that make up 66.3% of the current sample — at just the time when support is most needed. The results of the present study indicate that a more developmentally appropriate policy framework would consider startups based on multidimensional progress indicators: innovation activity, customer development, team growth, and market positioning, as well as revenue and funding raised. This would clearly reflect the real situation of startups in Pakistan's technology industry and would also ensure that support is focused on those startups that have real developmental momentum instead of merely being in need of funding.

6. Conclusion

The study used quantitative, descriptive and multidimensional approach in analysis of the startup performance indicators in the technology startup sector of Pakistan. Results from the survey of 252 technology startups show that overall, performance was rated as moderate to positive, in terms of financial, market, innovation, customer and operational indicators. The start-up performance scale had good internal consistency (α = .89) with all seven items above the neutral point

on the seven-point scale. The study makes a contribution to the literature on start-up performance by adding to the arguments for multidimensional performance assessment in resource-constrained emerging economies. While financial metrics remain important in early-stage startups, they are not the sole way to gauge venture progress. Many tech startups are still in the product development, customer acquisition, market positioning and building internal capacity stages, and are not yet financially mature. Therefore, there is a need to have broader indicators for the accurate assessment of startups in a context-specific way.

The findings have implications for technology start-up ecosystem in Pakistan. The sampled firms were mostly young, micro or small with limited resource; hence a narrow financial assessment would not show the situation of their performance. Balanced evaluation frameworks should be adopted by startup founders, incubation centers, accelerators, investors, and policymakers, which should incorporate financial, market, innovation, customer, and operational indicators. Such structures can help to better assess the progress of startups and to distinguish those with genuine development potential. There are some limitations in this study. First, the cross-sectional survey design is only able to capture startup performance at one specific point in time. Longitudinal designs would be helpful in gaining insight into how performance indicators evolve from early-stage development to scaling. Second, the study is based on subjective perceptual indicators as reported by founders and senior managers. While this is appropriate in the absence of reliable financial data in many early-stage startups, future research should take into account combining perceptual measures with objective measures such as sales revenue, employment growth, or funding raised, where data is available. Thirdly, the study is limited to Pakistani technology startups and hence the generalizability of the findings is limited. A comparative study of the differences between sectors or emerging economies would help to understand the cross-contextual differences in indicators of start-up performance.

The overall study indicates that the performance of start-ups in resource constrained economies could be understood in a multidimensional and context sensitive way. For tech startups in Pakistan, it's not only about performance but also about the financial journey, market expansion, innovation efforts, customer feedback, and operational growth.

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