MEASURING TECHNOLOGICAL CAPABILITY AND BUSINESS PERFORMANCE POST-COVID ERA: EVIDENCE FROM SMALL AND MEDIUM-SIZED ENTERPRISES(SMEs) IN NIGERIA

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Abstract:
The coronavirus pandemic has resulted in a significant shock to businesses, with negative implications on present production capacity. Simultaneously, technology is being increasingly recommended as a significant means of minimising economic losses caused by the pandemic. Survival and lack of performance of small and medium-sized businesses continue to generate public discourse, intellectual interest, and attention. Though relationship between technological capabilities and business performance is more intricate than is often assumed. Inadequate technological capability is one of the primary factors contributing to business situation. Therefore, relationship between technological capability (TC) and business performance was examined amongst selected small and medium-sized businesses in Lagos State. This study used a survey research methodology with a sample size of 742 owner-managers of chosen SMEs in Lagos State. A questionnaire that was adopted and validated for the study was used to collect data. The questionnaire questions' Cronbach's alpha coefficients range from 0.77 to 0.88. The response rate to the survey was 94.5 percent. Using descriptive and inferential statistics, the acquired data was analysed (Pearson product moment correlation and regression analysis). The examination of the data demonstrated a significant association between technological capacity and small company performance (= 0.090, t = 3.029, F= 245.45 p.05). The conclusion of this research is that technical aptitude is a resource that enhances the performance of small businesses, with theoretical and practical consequences for businesses. It is recommended that the managers of small and medium-sized enterprises (SMEs) in Lagos State use their technology capability as a business resource, since this could help them generate new ideas or enhance existing goods.

Keywords: competitive advantage, knowledge, pandemic, profitability, resources.

1. Introduction

Small and medium-sized businesses (SMEs) account for more than 90% of all businesses worldwide and are the key drivers of social mobility, accounting for seven

out of ten employment opportunities (World Bank, 2021). SMEs are regarded as the most important source of employment in every nation. Although the size, number of workers, investment volume, and yearly turnover of SMEs vary, they are regarded as a key sector world-over and drivers of the economy and wealth creation. SMEs all across the world continue to look for avenues and creative techniques to go farther and improve performance, particularly with the outbreak of the novel coronavirus (COVID-19) pandemic in late 2019 (Ozili, 2020; Feng-Jyh, & ChihuFeng, 2021; Paolo & Galeotti 2020). As a consequence of the emergence of the COVID-19 virus, countries throughout the world have been compelled to react despite minimal knowledge and great uncertainty. The COVID-19 pandemic has therefore deepened the many challenges facing SMEs in particular, creating extraordinary and unprecedented hurdles. The impact has been more severe on developing economies, particularly in Sub-Saharan Africa, Nigeria inclusive (Inegbedion, Inegbedion, Obadiaru, Asaleye, Ayeni, & Aremu, 2020; Paolo & Galeotti 2020). In recent times in Nigeria, we have seen more businesses reporting low or no profit and, in some cases, no revenue due to the advent of covid-19 and the case of business failures is equally high (Olubiyi,2022).

According to the Organization of Economic Cooperation and Development (2020) report, the major impact of the pandemic has been the decline in the level of economic and business output of between twenty percent (20%) and twenty-five percent (25%) in many economies, with consumer expenditures perhaps falling by around one-third. Businesses continue to operate, plan, and become more aware of the need to adapt to the "new normal" (Jorda, Singh, & Taylor, 2020), which is considerably the use of technology to maintain business performance and continuity. In a volatile and dynamic environment, the business resources and competencies can serve as the foundation of competitive advantage. Therefore, technology resources and technological capability have and continue to change the way business is executed and how communication and customer engagement are carried out.

Several published research studies have established a relationship between technology and business performance, primarily in emerging economies such as Russia, India, Brazil, Mexico, and China (Agustia, Haryanto, Permatasari, & Midiantari, 2022; Blichfeldt, & Faullant, (2021); Haryanto, Permatasari, & Midiantari, 2022; Boateng, Kosiba, 2021; Okoe, 2019; Cirillo, Fanti, Mina, & Ricci, 2022; Jiang, Mavondo, & Zhao, 2020; Khin & Ho, 2019; Olczyk, & Kuc-Czarnecka, 2022; Lee, Lee,& Garrett, 2019; Heredia, Geldes, Kunc, & Flores, 2019; Olabode, Boso, Hultman,& Leonidou, 2022). On the contrary, despite the apparent performance improvement possibilities through technological capability, a large number of people in the SME sector have been found to view technological capability and technology usage with skepticism. This is particularly prevalent among the smallest SME businesses, referred to as microenterprises (Cataldo, Pino & McQueen, 2020). Even though small and medium-sized businesses (SMEs) in developed countries are getting better at using technology, SMEs in developing countries aren't doing as well (Napitupulu, Syafrullah, Rahim, Abdullah, & Setiawan, 2018; Rahayu & Day, 2017).

In Nigeria, small businesses have yet to realize and use technology to improve their performance and business outcomes. According to Olubiyi (2022), most SMEs in Nigeria are still unaware of the advantages of technological capability. A number of studies, including Kuteyi (2016), Apulu and Lathman (2017), Ayodeji (2015), and

Namusonge, Muturi, and Olaniran (2016), indicate that technological capability and the adoption of technology amongst businesses in Africa, particularly Nigeria, is comparatively low when compared to industrialized nations. According to Ghobakhloo, Hong, Sabouri, and Zulkifli (2016), the rate of technological capability and innovation adoption by small and medium-sized enterprises (SMEs) has remained relatively low. While large organizations have increasingly profit from technological capability than SMEs, by directly increased sales, market share, and even saving costs. According to Ayodeji (2015) and (Gbandi & Amissah 2014), a number of reasons, such as insufficient financial resources, have contributed to the low degree of SME adoption of technology for increased performance.

In addition, an extensive literature review indicates no consensus on the relationship between technological capability and business performance (Martínez-Caro, Cegarra-Navarro & Alfonso-Ruiz, 2020; Usai, Fiano, Petruzzelli, Paoloni, Briamonte, & Orlando, 2021; Zhen, Yousaf, Radulescu & Yasir, 2021). The lack of evidence to establish a positive relationship between technology capability and business performance is the gap this paper addresses. As a result, the goal of this paper is to fill the gap by providing background information on technological capability and business performance, as well as examining the relationship in selected SMEs in Lagos State. The study also seeks to contribute to greater understanding of the relationship between the two variables- independent (technological capability) and dependent (business performance).

2. Literature Review

Concept of Small and Medium Enterprises (SMEs) in Nigeria

In Nigeria, there is no precise definition of SME, and it fluctuates over time and from institution to organization. Various organizations or institutions in Nigeria have defined SMEs in various ways at different periods, but the definitions all contain fixed assets, gross output, and the number of workers as common measures (Bouazza, Ardjouman, & Abada, 2015; Olubiyi,2020).

Table 1. Classification Adopted by SMEDAN for National Policy on MSMEs

S/N	Size Category	Employment	Assets (N million) (excluding land and buildings)
1.	Micro enterprises	Less than 10	Less than 5
2.	Small enterprises	10-49	5 – less than 50
3.	Medium enterprises	50-199	50- less than 500

Source: Small and Medium Enterprises Development Agency of Nigeria (SMEDAN)

Small and medium-sized enterprises (SMEs) are key economic actors and drivers of economic development the world over (Abisuga-Oyekunle, Patra & Muchie, 2020; Al-Tayyar, Abdullah, Rahman, & Ali, 2021; Cataldo, Pino, & McQueen, 2020; Obinna, 2022; Olubiyi, Egwakhe, & Akinlabi, 2019) and indexes of industrialization, modernization, urbanization, and gainful and meaningful employment for all those who are able and willing to work or establish a business. Small businesses have ten (10) to forty-nine (49) employees, whereas medium-sized businesses have fifty (50) to one hundred and ninety-nine (199) employees (Obinna, 2022). The SME sector may help transition to a market economy by creating jobs, producing money, advancing technology, and supporting social development

(Ahmad, Abdul Rani, & Mohd Kassim, 2010). SMEs may boost social and economic growth, notably in Nigeria. They may also gain management and technical abilities. SMEs account for 96% of businesses and 84% of employment in Nigeria (PWC, 2021). According to the PWC study for 2020–2021, they account for 96% of all enterprises in the country and contribute around 50% of the national GDP.

The SME sector is widely recognized as a key driver of economic development and job creation in both developing and developed nations (Abisuga- Oyekunle, Patra & Muchie, 2020; Al-Tayyar, Abdullah, Rahman, & Ali, 2021; Nugroho, Prijadi, & Kusumastuti, 2022). SMEs (businesses with 200 or fewer workers) are the world's biggest business sector. Small and medium-sized businesses play an essential role in the economic and social development of the nation. The performance and growth of small and medium enterprises (SMEs) is a major driver and index for income per capita, equitable income distribution, and the welfare and quality of life enjoyed by the citizenry (Ledwaba, Pelser, & Fatoki, 2019).

Technological Capability (TC)

Technological Capability is defined in different forms in the literature. According to Cerulli (2014), technological capability is acquiring, harmonizing, and improving knowledge and capabilities and provides businesses with sustainable innovative capacity and business results. Sobanke, Ilori, and Adegbite (2012) assert that technological capability is the ability to develop and design new products and processes and to update information about the physical world in novel ways, therefore transferring this knowledge into designs and instructions for the production of desired outputs. According to Skare and Soriano (2021), the whole notion of technological capability may be related to technological knowledge and the capacity to create new goods or processes while using manufacturing know-how to attain greater levels of efficiency. businesses are differentiated and distinct based on their technological capability (Usai, Fiano, Petruzzelli, Paoloni, Briamonte, & Orlando, 2021) and thus have an impact on innovation, which is a possible source of competitive advantage.

SME Performance

Based on the literature, performance in this research is defined as accomplishing the business objectives relating to sales, profitability, competition, market share, and other strategic goals. However, what defines business performance may vary depending on what the goal of the business is and the context in which it operates. Researchers have defined performance as the achievement of a set of desired outcomes arising from the accomplishment of business goals or marketing objectives (Chittithaworn, Islam, Keawchana, & Yusuf, 2011; Nawal, & Ghadah, 2021). Performance is an important phenomenon in any business, particularly small and medium- sized enterprises. enterprises. The achievement of a high degree of performance implies corporate success (Mahmudova & Kovács, 2018; Olubiyi, 2020). The performance of SMEs is a key indicator for the level of industrialization, modernization, urbanization, employment generation, income per capita, equitable distribution of income, and standard of living by the citizenry (Ugwu, 2021).

Technological Capability and business performance

According to Richardson, (2021) technologies and technological capability are fundamental for companies' performance and to acquire competitive advantage. More economic transactions have switched online as enterprises resort to digital channels to perform their operations in the aftermath of the COVID-19 shock and

economic lockout, with the ability to ameliorate the negative impacts on production (OECD, 2021; Cirillo, Fanti, Mina, & Ricci, 2022; Soluk *et al*., 2021; World Bank, 2021). From a review of the literature, there are several interesting points worth noting. In recent years, technological capability has come to be viewed as the strategic resource that allows busineses, especially large firms, to create performance differentials within their industry (Duysters & Hagedoorn, 2000; Nugroho, Prijadi, & Kusumastuti, 2022; Nelson, 1991). The resource-based view (RBV) was used as the theoretical lens for this paper, which stated that business gain a competitive advantage through resource capabilities (Dierickx & Cool, 1989; Wernerfelt, 1995).

As a matter of fact, the role of capability in building competitive advantage has been well documented in the literature on the resource-based view (RBV) (Bergman, Bergman, & Berger, 2017; Hendi, Zainul, & Willy, 2022). A resource-based view is an approach in which a company's competitive position in the industry in which it competes is determined primarily by its capabilities and resources. A central premise of RBV is that rival businesses compete on resources and capability (Hendi, Zainul, & Willy, 2022; Puryantini & Arfati, 2017) and suggests that superior resources and capability enhance business performance (Barney, 1991; Costa, Costa, Angelo, & Moraes, 2018). Technological capability, in particular, represents an important potential source of competitive advantage and superior performance in technologically competitive markets (Yonggui, Hing, Quan, & Youzhi, 2006). The resource-based view emphasizes the importance of the business resources and skills in deciding the scope of its operations and laying the groundwork for its long-term strategy.

It also considers how these resources and capabilities serve as the business's major source of profitability and performance (Hendi, Zainul, & Willy, 2022; Mahdi, Nassar, & Almsafir, 2019; Puryantini & Arfati, 2017). The resource-based view (RBV) holds that a business gains and retains competitive advantage by using limited, valued resources and capabilities (Peteraf, 1993; Wernerfelt, 1984). The resource-based view theory emphasizes that competitive advantage resources are characterised by four key characteristics: value, rarity, inimitableness, and non-substitutionality (VRIN) (Costa, Costa, Angelo, & Moraes, 2018; Ferreira & Fernandes, 2017). Technology is one of these assets.

The technological capability of a business is seen as a crucial strategic asset for attaining a competitive advantage in its sector (Hendi, Zainul, & Willy, 2022). In addition, it is widely proven that technological capability contributes to a business's competitive advantage. Usai *et al.* (2021) and Chen, Lin, Chen, Chao, and Pandia (2021) propose that enterprises should embrace technological change and capability as their core organisational strategy to adapt to changing market demands. Based on the findings of prior research and the gap in the literature, the following hypothesis was developed: H_{01}: Technological capability does not significantly affect the performance of SMEs in Lagos State. Resource integration has a significant positive effect on competitive advantage.

Conceptual Model

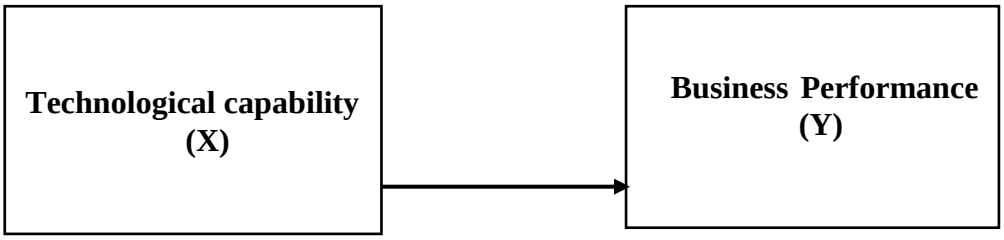

Figure 1. Author's Conceptual Model (2022)

The model sheds light on the relationship between technological capability and business performance, which is the research framework.

3. Methodology

This paper uses a cross-sectional survey and the methodology of Olubiyi, Egwakhe, and Akinlabi (2019) with a population consisting of owner/managers of selected SMEs in Lagos State that are registered with the Small and Medium Enterprises Development Agency of Nigeria (SMEDAN) in Lagos State to examine the existence of a relationship between technological capability and business performance. The five divisions of Lagos State are Ikorodu (783), Epe (593), Ikeja (4,446), Badagry (5373), and Lagos Island (5373). The population total is 11,665 (SMEDAN, 2016). Lagos State is chosen since it is often recognised as Nigeria's commercial hub. As a result of its cosmopolitan character, Lagos State has the greatest concentration of SMEs in Nigeria (Ajayi, 2010; Akande & Ojukutu, 2008; Olubiyi, Egwakhe, & Akinlabi, 2019). The research adopted a multistage sampling strategy, which included both stratified and random sample procedures. This required dividing the SMEs in the state of Lagos into five strata, namely Badagary, Epe, Ikeja, Ikorodu, and Lagos Island, from which a proportional sample was drawn. The implementation of a multi-stage methodology resulted in a representative sample of the SMEs, since they operate in various areas across Lagos State. According to Olubiyi *et al.,* (2019) the basic random sample used offered each element an equal chance of being picked.

Table 2. The Five Divisions of Lagos State with employees and proportionate numbers

S/N	Five Division in Lagos State	Population Size Per division	Total Population	Sample Size	Proportionate Sample Size	Sample %
1	Ikorodu	783	11,663	742	50	6.74%
2	Epe	593			38	5.12%
3	Ikeja	4,446			283	38.14%
4	Badagry	468			30	4.04%
5	Lagos Island	5,373			341	45.96%
TOTAL					**742**	**100%**

Source: Researcher's Computation (2022)

The Table 2 provides an overview of how the sample size is allocated across the chosen strata, with the respondents chosen using a simple random sampling process.

Table 3. List of small businesses by divisions in Lagos States Nigeria

Small business sector	Ikorodu	Badagry	Ikeja	Lagos Island	Epe	Total
Manufacturing	7	3	90	70	4	174
Real Estate	17	9	40	82	11	159
Agriculture	14	7	-	-	12	33
Service	12	11	153	189	11	376
Total	**50**	**30**	**283**	**341**	**38**	**742**

Source: Researcher's Computation (2022)

The sample size for this research was calculated using the Cochran (1997) formula. The formula is:

$$n = \frac{NZ^2pq}{d^2 (N-1) + Z^2pq}$$

where:

n = sample size

N = Total number of registered SMEs in Lagos State (N= 11,663)

Z = 95% Confidence Interval (Z = 1.96),

P = 0.5

q = 1 – p

d = degree of accuracy or estimation (d = 0.04)

therefore;

$$n = \frac{11,663\ (1.96)^2\ (0.5)\ (0.5)}{(0.04)^2\ (11,663 - 1) + (1.96)^2\ (0.5)\ (0.5)} = 571$$

To account for non-response and incorrectly completed questionnaires, the sample size was expanded by 171, or 30% of the entire sample size. This is what researchers suggest (Zikmund, 2000). Consequently, 30% of 571 equals 171. The sample size is then calculated as n = 571 + 171 = 742, suggesting that the sample size is 742. This study uses descriptive and inferential statistical analysis to analyse its data. For the purpose of testing the study's hypotheses, descriptive analysis is performed first, using the percentage distribution, mean, and standard deviation arranged in Tables. This is followed by inferential analysis, which is performed using simple linear and multiple regression and the Pearson Correlation method of analysis with the aid of IBM SPSS Software Version 22.0.

Data Analysis

The researcher distributed 742 copies of the questionnaire to the respondents. The received and fully completed copies totaled 701 and were considered usable for the analysis. This represents a response rate of about ninety-nine percent (94.5%), which was considered adequate in this paper. Table 4 presents the results of the response rate.

Table 4. Response Rate

	Frequency	Percentage %
Completed usable copies of questionnaire	701	94.47
Unreturned/Incomplete copies of questionnaire	41	5.53
Total received	742	100

Table 5. Model Summary of Regression on the Effect of Technological capability on growth of SMEs in Lagos state

(a) Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	0.765a	0.585	0.557	5.761
Predictors: (Constant), Technological Capability				

Source: Field Survey, 2022

(b)Anova						
Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
1	Regression	304.579	1	5104.579	245.45	0.00 l[b]
	Residual	22737.075	685	73.193		
	Total	23041.654	686			
a. Dependent Variable: SME Performance						
b. Predictor (Constant) Technological capability						

(c)Coefficients						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	26.054	1.476		16.323	0.000
	Technological capability	0.470	0.030	0.765	15.667	0.001
	Dependent variable: SME Performance					

Source: Researcher's result, 2022

Table 5 presents regression results on the effect of technological capability on SME performance of selected SMEs in Lagos State. The results presented in Table 2.1 show that technological capability significantly and positively affect performance of selected SMEs in State at 5% significance level (P = 0.090, t = 3.029, p<.05). The goodness of fit model presented in Table 2.2 (a) shows that there is a positive relationship between technological capability and SME performance (R = 0.115, p<0.05). This is further confirmed by coefficient of determination (R) of 0,013. Table 2.1(c), 1.3% of the variation in SME performance was explained by variation in technological capability while 98.7% of the variations remaining is unexplained by the model. This implies that there are other factors associated with SME performance which were not included in the model. Table 2.2(b) provides the results of the regression analysis of the variance (ANOVA). The results reveal that the

overall model was statistically significant. This was supported by an Fstatistics of 245.45 and the p-value was 0.000 which was less than the conventional probability of 0.05 significance level. The effect of technological capability on SME performance is summarized by the regression model as follows:

SP = 24.092 + 0.090TC …….. eq. (1)

Where:

SP: SME Performance

TC = Technological Capability

The regression model shows that when the value of technological capability is constant at zero, SME performance takes value of 24.092 implying that without technological capability, performance of selected SMEs in Lagos State was 26.808. The coefficient of technological capability was 0.090, implying that a unit increase in technological capability will lead to a 0.090 increase in; growth of selected SMEs in Lagos State. From the results, technological capability significantly affects performance of selected SMEs in Lagos State. This effect is positive as indicated by the regression coefficient (B = 0.090). This implies that as the technological capability become favourable, there is an increase in performance of selected SMEs in Lagos state. Based on these findings, the null hypothesis which; sates that technological capability does not significantly affect the performance of SMEs in Lagos state is hereby rejected.

4. Results and Discussion

The finding of the hypothesis revealed that technological capability significantly affects the performance of SMEs in Lagos state. This finding is in consistent with the conceptual framework and these studies **(**Agustia, Haryanto, Permatasari,& Midiantari, 2022; Anwar & Graham, 2021; Blichfeldt, & Faullant, 2021; Boateng, Kosiba & Okoe, 2019; Costa *et al.,* 2018 ; Cirillo, Fanti, Mina, & Ricci, 2022; Jiang, Mavondo, & Zhao, 2020; Haryanto, Permatasari, and Midiantari, 2022; Khin & Ho, 2019; Gupta, Tan, Ee, & Phang, 2018 ; Holdford, 2018; Lee *et al.,* 2016; Ma *et al.,* 2019; Mahdi *et al.,* 2019; Makhloufi *et al.,* 2018; Maury, 2018; Nugroho, Prijadi, & Kusumastuti, (2022). Portillo-Tarragona *et al.,* 2018; Sudaryati & Juliasih, 2018; Torres *et al.,* 2018; and Wang *et al.,* 2018). Furthermore, the effects of technological capability are contingent on several contextual factors. The findings of this paper provide more useful suggestions for SMEs and entrepreneurs to leverage technological capability for superior business performance. The study identified tech-level variations across the surveyed businesses in Lagos State. In high-tech businesses (services companies and manufacturing industry), it was found that a direct association exist between technology capability and performance particularly on the profitability and sales growth, whereas in low-tech firms (real estate and agriculture), low technology capability and low technology adoption exist in Lagos State. Overall, the technology capability is required in order to adopt, adapt and modify product innovation.

5. Conclusion and Recommendation

The major findings of the study are that technological capability does significantly affect the performance of SMEs in Lagos state (β= 0.090, t = 3.029, F= 245.45 p<.05); The study also concludes that technological capability significantly affects the business performance of SMEs in Lagos state, therefore, SMEs should

not be technologically constrained. The key theoretical contribution is that, while supporting the general thrust of the resource-based theory, this paper offers important qualifications to the theory in respect of technological capability as a resource. The findings of this paper suggest specific implications for SMEs and businesses in general. For example, it discusses the direct effects of business' capabilities on business performance and tends to presume that a whole host of competitive advantages will fall into place when business invest in unique resources like technology. The findings of this paper will have significant practical implications for public and private Nigerian policymakers. It will allow them, including entrepreneurs, to better understand the technological capability of SMEs and the challenges impacting their deployment of technology in Nigeria. As a result, it is recommended that the management of SMEs and owner-managers in Lagos State utilize technological capacity as a business resource since it may be beneficial for innovations or product developments. SME technological capabilities and adoption post-COVID era may provide customers with differentiation and convenience, hence enhancing business performance. Such technology capability can be designed around, packaging, delivery, usability, automation, and product variety. This study contributes to the knowledge base for a better understanding of the technological capability of small businesses in Nigeria.

6. Limitations and future directions

The study has limitations that need to be acknowledged. It recognized that the findings and implications of this paper are situated within Lagos, Nigeria, and primarily small businesses were the focus, which may limit the generalizability of the findings. Therefore, the cross-sectional nature of the paper prevents the author from making strong claims of causality. The study could be expanded with similar studies conducted across large businesses or publicly traded companies in Nigeria or other countries. The sample size can be raised by considering more respondents with innovative data gathering techniques to achieve more generalizability and trustworthiness. For this research, the absence of data in the majority of small businesses in Lagos was the greatest challenge to obtaining objective performance measurements. For this reason, the non-financial performance indicators were adopted. According to Khalil *et al.* (2021), subjective measurements may be produced in the absence of objective measures. Nonetheless, the limitations of this research, can be recognized as research gaps for future studies, and further replicated studies across different samples, regions, and countries are recommended.

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