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AN ANALYSIS ON COMPETITIVENESS OF SPICES IN MARKET

G.ANTO GNANA UDAYA
Ph.D Research Scholar (Part-Time)
Reg.No: 20221271012003
PG & Research Department of Commerce
St. John's College, Palayamkottai, Tirunelveli – 627 002
(Affiliated to Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli – 627 012)
Dr.G.KOIL SAMUVEL
PG & Research Department of Commerce,
St. John's College, Palayamkottai, Tirunelveli – 627 002
(Affiliated to Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli – 627 012)

ABSTRACT
India's spices are well-known both within the country and internationally for their flavor and aroma. It is well acknowledged that India is among the leading producers, consumers, and exporters of spices worldwide. Data from secondary sources were used in the study. The level of export competitiveness and market competitiveness for the primary spices, which include cumin, black leaf, turmeric, and chilli, was measured by employing a constant pricing analysis that was performed. It was discovered that the global market competitiveness of chili, turmeric, and coriander is quite high.
Keywords: Spices, Pricing, Market Competitiveness

INTRODUCTION
India's contribution to the global spice market is both historical and monumental. Known as the 'Spice Bowl of the World,' the country boasts a grand variety of spices that are integral to culinary practices around the globe. In terms of trade, India has maintained a stronghold, accounting for approximately 75% of the global spice production and 47% of global spice exports (ITC Trade Map, 2020). However, India's stronghold in this sector is continually shaped and influenced by international regulatory bodies, primarily the World Trade Organization (WTO). This research aims to delve into the complex dynamics between India's spice export industry and the impact of WTO's policies, regulations, and interventions. India's association with spices dates back thousands of years, with historical trade routes such as the Spice Route serving as critical channels for spice trading between India, the Middle East, and Europe (Krishna, et al., 2019). Today, spices like turmeric, pepper, cardamom, and ginger contribute significantly to India's Gross Domestic Product (GDP). For instance, India exported spices worth $3.65 billion in 2019-2020, an increase of 5% over the previous year (Spices Board India, 2020). This demonstrates the increasing global demand for Indian spices and the sector's vitality to the Indian economy.

The World Trade Organization (WTO), founded in 1995, is a pivotal institution that governs international trade by ensuring that trade flows smoothly, predictably, and as freely as possible. The WTO's framework includes numerous agreements and policies concerning various sectors, including agriculture and commodities like spices (WTO, Agriculture). These policies aim to level the playing field by reducing trade barriers, such as tariffs and quotas, but also impose quality standards that exporters must meet to ensure consumer safety. The WTO's Sanitary and Phytosanitary Measures (SPS Agreement) and Technical Barriers to Trade (TBT Agreement) are particularly relevant to spice exports.

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These agreements mandate that spices must meet specific quality standards, including pesticide residues and microbial contamination levels, to be eligible for international trade (WTO, SPS & TBT Agreements). For many Indian exporters, especially small-scale operators, complying with these international standards can be both challenging and resource-intensive (Chaturvedi & Nagpal, 2016).

The relationship between India's spice exports and WTO regulations presents a nuanced landscape of opportunities and challenges. While WTO policies offer a structured framework for international trade, the onus is on Indian exporters to adapt to these standards and regulations effectively. Understanding this complex interplay is vital for stakeholders to navigate the increasingly globalized spice market. Future research can focus on how digitalization trends, as endorsed by the WTO, could redefine India's spice trade in the coming years.

SPICES IN TAMIL NADU

Tamil Nadu, one of the southern states of India, is a significant player in the national spice market. The region is known for its diverse agricultural practices, which include the cultivation of a wide variety of spices. The state's contribution to India's spice exports is substantial and has been on a steady rise in recent years. This section aims to provide a detailed analysis of the major spices exported from Tamil Nadu, including specifics like export details and target countries.

- **Black Pepper:** Tamil Nadu is one of the significant producers of black pepper, particularly in the regions of the Western Ghats. The climatic conditions in these areas are well-suited for black pepper cultivation.
- **Cardamom:** The state is a prominent producer of both green and black cardamom. The hills of the Nilgiris and parts of Coimbatore are especially known for cardamom cultivation.
- **Turmeric:** Erode, in Tamil Nadu, is one of the largest producers and trading centers for turmeric in both the national and international markets.
- **Red Chilli:** The Guntur variety, although primarily grown in Andhra Pradesh, is also cultivated in some parts of Tamil Nadu.
- **Cumin:** This spice is grown in limited areas but is a significant contributor to the state's spice export basket.
- **Coriander:** Mainly cultivated in regions with cooler climates, coriander from Tamil Nadu is known for its high oil content and quality.
- **Fenugreek:** Mostly grown in the dry regions, the state produces fenugreek that is primarily used in culinary and medicinal applications.
- **Cloves and Nutmeg:** These spices are generally grown in the hilly areas of the state, including Kodaikanal.

EXPORT DETAILS

According to the data provided by the Agricultural and Processed Food Products Export Development Authority (APEDA), the value of spice exports from Tamil Nadu stood at approximately $300 million in the financial year 2019-2020. This figure represents a significant portion of India's total spice exports (APEDA, 2020).

- **Volume:** The state exports thousands of tonnes of spices annually, with the top contributors being turmeric, pepper, and cardamom.
- **Quality:** Tamil Nadu's spices are known for their high-quality standards, often exceeding the requirements set by the Spices Board of India.
- **Packaging and Processing:** Modern facilities in the state ensure that spices are adequately processed and packaged, making them ready for export without the

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need for further processing in the target countries.

STATEMENT OF THE PROBLEMS

Spice exports serve as a significant economic driver in India, with the country being one of the largest producers and exporters of spices in the world. While this is a national phenomenon, specific states such as Tamil Nadu contribute significantly to India's standing as a global leader in the spice market. However, spice exports are not devoid of challenges. These challenges take on more complexity when viewed against the international backdrop where the World Trade Organization (WTO) plays a significant role in shaping trade policies. Among the various stakeholders in this intricate setting are small, medium, and large enterprises each with its unique set of challenges and expectations. This research aims to delineate these challenges, aspirations, and the role of international bodies like the WTO in influencing Tamil Nadu's spice exports.

The complexity of spice exports from Tamil Nadu is compounded by the variety of stakeholders and the international trade landscape, significantly influenced by the WTO. Whether it's addressing the differentiated needs and challenges of small, medium, and large enterprises, understanding the role of the WTO, or gauging the expectations and opinions of exporters, each problem area offers multiple avenues for deep, explorative research. Collectively, these problem statements serve as the bedrock upon which this research is founded. The findings are expected to contribute significantly to the broader understanding of how international trade in spices can be made more equitable and efficient for all stakeholders involved.

OBJECTIVES OF THE STUDY

1. To understand the trends of spices exports from India (Spices List and export countries).
2. To study the demographical profile and operational aspects of spice exporters of Tamil Nadu.
3. To assess the perspectives of spice exporters on the functions and regulations implemented by the World Trade Organization (WTO).
4. To identify the prevailing challenges encountered by spice exporters in the course of conducting their export business.
5. To ascertain the expectations and needs that spice exporters have from the World Trade Organization (WTO) in order to enhance their trade opportunities.
6. To solicit self-evaluative feedback from spice exporters regarding their own performance across various metrics, such as product quality, reliability, customer service, and regulatory compliance.

SCOPE OF THE STUDY

This study embarks on an exhaustive analysis of multiple aspects of spice exports from Tamil Nadu, India, with particular emphasis on the interplay between local exporters and international regulatory bodies like the World Trade Organization (WTO). The research aims to be a comprehensive source of information, views, and suggestions that can serve policymakers, exporters, and international bodies. Trends of Spice Exports from India: This aspect provides the foundational context for the study. It will include an in-depth exploration of the various spices exported from India, their volumes, value, and primary countries of destination.

The study aims to create a nuanced understanding of who the exporters are, how they operate, and what unique challenges and advantages they experience. This will include surveys, interviews, and data collection, providing a holistic view of the exporter landscape in Tamil Nadu. Given that the WTO plays a critical role in international trade,

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this research will focus on how the organization's regulations and policies impact the spice exporters of Tamil Nadu. Assessments and perspectives will be gathered to gauge whether the WTO's functions align with the needs and challenges of these exporters.

METHODOLOGY

In this study the researcher has used the Descriptive research design in single cross sectional research. Methods used for the collection and analysis of data were provided in this section. Specific tools of analysis and empirical models were also presented.

Collection of Data

This study is based on both primary and secondary data. The required primary data were collected from the selected respondents through personal interview and questionnaire method. The data were collected over a period of 6 months (December 2022 to April 2023). Care has been taken to avoid bias and necessary cross checks that were applied to ensure the accuracy of data.

Sample Size

As far as the present study is concerned, the researcher has collected the data required from the sample population by snowball Sampling Technique under Non-probability Sampling Method. For this purpose the researcher has used the Cochran's formula for calculating sample size when the population is large and infinite.

For example, suppose researcher want to calculate a sample size of a large population whose degree of variability is not known assuming the maximum variability, which is equal to 50% (p=0.5) and taking 95% confidence level with ± 5% precision, the calculation for required sample size will be as follows-

p = 0.5 and hence q = 1-0.5 = 0.5; e = 0.05; z = 1.96 n_o =

$$\frac{(1.96)^2(0.5)(0.5)}{(0.05)^2} = 384.16 = 384$$

Minimum required sample size for the study is 384.

Calculating sample size when the population is finite

Here, the researcher has used Cochran's formula for calculating sample size when the population is finite, Cochran pointed out that if the population is finite, he proposed a correction formula to calculate the final sample size in this case which is given below

$$n = \frac{n_0}{1 + (\frac{n_0 - 1}{N})}$$

Here, n_o is the sample size derived from equation and N is the population size. To

$$n = \frac{384}{1 + (384 - 1)/852}$$

calculate the sample size for the population, where population size is N = 852. According

$$= \frac{384}{1 + 383/852}$$

to the formula, the sample size is 384 at 95% confidence level with a margin of error equal to 0.05. If $\frac{n0}{N}$ is negligible then n_o is a satisfactory approximation to the sample size. So, the correction formula is used to calculate the final sample size. Here, N = 852, n_o = 384.

Minimum required sample size $= 265$ sample. For accuracy of the research and based on

$$= \frac{384}{1.45}$$

pilot study experience, researcher fix 300 respondents for the study.

$$= \frac{384}{1 + 0.45}$$

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FRAMEWORK OF ANALYSIS

After the fieldwork, the data have been carefully scrutinized and edited in order to ensure accuracy, consistency, and completeness. The data tabulated are systematically processed and interpreted on the basis of the objectives formulated. Statistical tools such as Percentage, weighted average table are used for basic analysis, One Way ANOVA Multiple Correlation, Confirmatory Factor Analysis, Structural Equation Modeling, Mediation and Moderation are used for hypothetical analysis.

1. Percentage analysis

Percentage analysis is the method to represent raw streams of data as a percentage (a part in 100 - percent) for better understanding of collected data. Percentage Analysis is applied to create a contingency table from the frequency distribution and represent the collected data for better understanding.

2. One-way ANOVA

One-way Analysis of Variance (ANOVA) is a statistical method used to test the equality of three or more means at one time by using variances. This test is commonly employed when a researcher aims to determine if there are any statistically significant differences between the means of three or more independent groups. One-way ANOVA is particularly valuable when dealing with complex experiments that involve multiple categories or levels, and when the sample sizes across the groups are unequal. The method assumes that the data are normally distributed and that variances across groups are equal. It's often followed by post-hoc tests to identify which specific groups differ from each other when the ANOVA indicates significant differences.

3. Confirmatory factor analysis (CFA)

Confirmatory factor analysis (CFA) is a multivariate statistical procedure that is used to test how well the measured variables represent the number of constructs. Confirmatory factor analysis (CFA) and exploratory factor analysis (EFA) are similar techniques, but in exploratory factor analysis (EFA), data is simply explored and provides information about the numbers of factors required to represent the data. In exploratory factor analysis, all measured variables are related to every latent variable. But in confirmatory factor analysis (CFA), researchers can specify the number of factors required in the data which measured variable is related to which latent variable. Confirmatory factor analysis (CFA) is a tool that is used to confirm or reject the measurement theory.

4. Multiple Correlation:

Multiple correlation is a statistical technique used to study the relationship between one dependent variable and two or more independent variables. This technique enables us to determine the extent to which several variables can collectively predict or explain the variance in a specific dependent variable. In other words, it provides an understanding of how the dependent variable changes when multiple independent variables are altered. The multiple correlation coefficient (R) provides a measure of the strength and direction of this linear relationship, ranging from -1 to +1. An R value close to +1 indicates a strong positive correlation, meaning as the independent variables increase, the dependent variable also increases, and vice versa. A value close to -1 shows a strong negative correlation, implying that an increase in independent variables results in a decrease in the dependent variable. An R value close to 0 indicates little to no relationship between the variables (Cohen et al., 2003).

5. Structural equation modeling

Structural equation modeling (SEM) is a form of causal modeling that includes a diverse set of mathematical models, computer algorithms, and statistical methods that fit

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networks of constructs to data.

LIMITATIONS OF THE STUDY

The study carries several limitations that should be acknowledged for a comprehensive understanding of its scope and findings. First, the research relies solely on secondary data to analyze India's spice exports, which may not encompass all variables or nuances that primary data might capture. Second, the study confines itself to an eight-year period, with data available up until 2023, which may not provide a long-term view of the trends and fluctuations in spice exports.

Third, primary data collection is focused only on the exporters in Tamil Nadu, thereby limiting the generalizability of the findings to other states in India or different types of exporters, such as those who are engaged in the export of goods other than spices. This geographic focus may not fully encapsulate the diversity of exporters' experiences and opinions across the country.

Fourth, the study emphasizes the exporters' views on the World Trade Organization (WTO) to the exclusion of other possibly influential international bodies or trade regulations. Given the multi-faceted nature of international trade, focusing solely on WTO perspectives may not offer a comprehensive view of the international trade environment.

Lastly, the study addresses challenges faced by exporters and their performance based solely on their self-reported opinions. This subjective data may not fully align with objective measures of performance or challenges, leaving potential gaps in our understanding of the actual difficulties faced by spice exporters in Tamil Nadu.

These limitations should be taken into account when interpreting the study's findings, and they offer avenues for further research to provide a more holistic view of India's spice export sector

MAJOR SPICES GROWN IN INDIA

Pepper - The King of all spices and best known in the world. Cardamom - The Queen of all spices.
Asafoetida - A popular spice in foods and medicine.
Chilli - Grown throughout the country and is used in almost all dishes
Cumin - It has a particular value in the blending of Indian curry powder. Fennel - The dried ripe fruit of a perennial aromatic herbaceous plant.
Ginger - A major crop cultivated in India marketed as fresh and dried spice. Mustard - It is used for its appetising flavour and preservative value.
Parsley - One of the best known and used in culinary spices. Pomegranate - It is endowed with excellent medicinal properties. Turmeric - The spice is quite popular in foreign countries.
Bishops Weed - A native Indian plant is an aromatic spice.
Cassia - The dried husk of a small, bushy evergreen tree.
Clove - One of the oldest spices in the world.
Coriander - The fragrant spice has its own medicinal properties. Fenugreek - The ripe, dried fruit of an annual leguminous herb.
Garlic - It has an attractive flavour and acknowledged medicinal value. Mint - Mint is the Erec plant with dark green leaves with pleasant flavour. Onion - One of the oldest spices known to Human race.

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TOP 10 SPICES EXPORTED BY INDIA

As of my last update in September 2021, India is a major exporter of various spices. The top 10 spices exported by India can vary based on the year and market demand. However, traditionally, the following spices have been among the top exports:

- **Chilli:** India is one of the largest producers and exporters of chilli in the world.
- **Cumin:** Cumin seeds and its ground form are popular exports from India, widely used in various cuisines.
- **Turmeric:** India is the largest producer and exporter of turmeric, which is used both as a spice and for its medicinal properties.
- **Cardamom:** Known as the "Queen of Spices," India is a significant exporter of both green and black cardamom.
- **Coriander:** Coriander seeds and ground coriander are essential spices in Indian and many other cuisines.
- **Fennel:** Fennel seeds are popularly used in Indian cooking and are also exported in significant quantities.
- **Fenugreek:** Fenugreek seeds and leaves are commonly used in Indian spice blends and exported globally.
- **Mustard:** India is a major exporter of mustard seeds and mustard oil.
- **Ginger:** India exports both fresh and dried ginger to various countries.
- **Garlic:** India is a significant exporter of garlic, which is widely used in various cuisines and for its health benefits.

DATA ANALYSIS AND INTERPRETATION

Exporters performance

Size of the company based Exporters' perceptions towards World Trade Organization (WTO)

This table examines the relationship between the size of a company and its exporters' perceptions towards the World Trade Organization (WTO). The hypothesis (H0) being tested is whether these perceptions are significantly influenced by the company's size, categorized as small (1- 50 employees), medium (51-100 employees), and large (more than 100 employees). The perceptions are divided into positive and negative opinions, and the table includes F-values and significance levels (Sig.) to analyze the impact.

H_0: Exporters' perceptions of the World Trade Organization (WTO) are not significantly affected by differences in their company Size.

Table No

Size of the company based Exporters' perceptions towards World Trade Organization (WTO)

Size of the company	Small (1-50 employees)	Medium (51-100 employees)	Large (More than 100 employees)	Total	F	Sig.
Positive Opinion	2.99	3.37	2.66	3.12	6.064	0.003
Negative Opinion	3.09	2.86	3.00	2.98	1.630	0.198

Source: Computed Data

The data in the table suggests a significant variation in positive opinions about the WTO based on company size, but not in negative opinions. The F-value for positive

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opinions is 6.064 with a significance level of 0.003, which is below the conventional alpha level of 0.05. This indicates that the null hypothesis (H0) can be rejected for positive opinions, meaning there is a significant effect of company size on positive perceptions of the WTO.

Specifically, medium-sized companies (51-100 employees) show the highest positive opinion towards the WTO (3.37), followed by small companies (1-50 employees) with a score of 2.99. Interestingly, large companies (more than 100 employees) have the lowest positive opinion score (2.66). This pattern suggests that medium-sized companies are most favorable towards the WTO, whereas large companies are less so.

In contrast, the F-value for negative opinions is 1.630 with a significance level of 0.198, which is above the 0.05 threshold. This indicates that the differences in negative opinions based on company size are not statistically significant. The scores are relatively close across different company sizes, with small companies showing slightly higher negative opinions (3.09) compared to medium (2.86) and large companies (3.00).

Overall, the data shows that company size significantly influences positive but not negative perceptions of the WTO. Medium-sized companies appear to have the most favorable view, while the size of the company does not significantly alter negative perceptions

Age group based Exporters' opinion about their own performance

This table presents data on exporters' self-assessment of their performance across various metrics, segmented by age groups. The age groups are divided into three categories: Below 35 Years, 35 – 50 Years, and Above 50 Years. The performance metrics evaluated include Quality, Reliability, Customer Service, Regulatory Compliance, Innovation and Adaptability, and Overall Performance.

H_0: Exporters' opinions about their own performance are not significantly affected by differences in their age groups.

Table

Age group based Exporters' opinion about their own performance

Age group of Exporter	Below 35 Years	35 – 50 Years	Above 50 Years	Total	F	Sig.
Quality Metrics	2.39	3.3	3.64	3.12	36.5	0.000
Reliability Metrics:	2.27	3.52	3.41	3.12	43.456	0.000
Customer Service Metrics	2.81	3.44	3.89	3.37	20.345	0
Regulatory Compliance	2.64	3.31	3.89	3.27	30.015	0
Innovation and Adaptability	2.23	3.85	3.52	3.28	74.386	0
Overall Performance	2.3	3.48	4.03	3.27	100.128	0

Source: Computed Data

- **Quality Metrics:** Exporters above 50 years rate their quality highest (3.64), followed by those in the 35–50 years group (3.3), and the lowest scores are from those below 35 years (2.39). The F-value is 36.5, with a significance (Sig.) of 0.000, indicating a statistically significant difference between age groups.

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- **Reliability Metrics:** Similar to Quality Metrics, the highest score is from the above 50 years group (3.41), closely followed by the 35–50 years group (3.52), with the below 35 years group rating themselves the lowest (2.27). The significant F-value of 43.456 suggests a notable difference across age groups.
- **Customer Service Metrics:** Exporters above 50 years again rate themselves highest (3.89), with a gradual decrease in ratings from the 35–50 years group (3.44) to the below 35 years group (2.81). The F-value of 20.345 with a significance of 0 indicates statistical significance in these differences.
- **Regulatory Compliance:** The trend continues, with the above 50 years group rating themselves highest (3.89), followed by the 35–50 years group (3.31), and the below 35 years group (2.64). The F-value of 30.015 again points to significant age group differences.
- **Innovation and Adaptability:** Interestingly, the highest score here is from the 35–50 years group (3.85), suggesting this group sees itself as most innovative and adaptable. This is followed by the above 50 years group (3.52) and the below 35 years group (2.23). The very high F-value of 74.386 strongly indicates significant differences.
- **Overall Performance:** Consistent with the individual metrics, the above 50 years group rates their overall performance highest (4.03), followed by the 35–50 years group (3.48) and the below 35 years group (2.3). The extremely high F-value of 100.128 reinforces the significant difference across age groups.

In all categories, the significance level is 0, far below the typical threshold of 0.05, strongly rejecting the null hypothesis (H0) and indicating that exporters' opinions about their performance are significantly affected by their age group. The data consistently shows that older exporters rate their performance higher across all metrics.

Level of Educational Qualification based Exporters' opinion about their own performance

This table examines the relationship between exporters' self-assessment of their performance and their level of educational qualification. The qualifications are categorized as School Level, Undergraduate (U.G) Level, and Postgraduate (PG) and above. The performance metrics include Quality, Reliability, Customer Service, Regulatory Compliance, Innovation and Adaptability, and Overall Performance.

H_0: Exporters' opinion about their own performance are not significantly affected by differences in their Level of Educational Qualification

Table

Level of Educational Qualification based Exporters' opinion about their own performance

Level of Educational Qualification of Exporter	School Level	U.G level	PG and above	Total	F	Sig.
Quality Metrics	2.44	2.91	3.90	3.12	48.078	0.000
Reliability Metrics:	2.44	3.13	3.56	3.12	18.876	0.000
Customer Service Metrics	2.91	3.24	3.89	3.37	15.584	0.000
Regulatory Compliance	2.11	3.41	3.80	3.27	59.068	0.000
Innovation and Adaptability	2.54	3.12	4.02	3.28	36.376	0.000

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Overall Performance	2.46	3.14	4.01	3.27	56.319	0.000

Source: Computed Data

- **Quality Metrics:** Exporters with PG and above qualifications rate their quality the highest (3.90), followed by those at U.G level (2.91), and the lowest scores are from school- level educated exporters (2.44). The significant F-value of 48.078 indicates a statistically significant difference across educational levels.
- **Reliability Metrics:** Again, PG and above educated exporters rate themselves highest (3.56), with U.G level (3.13) and school level (2.44) following. The F-value of 18.876 suggests significant differences in self-assessment based on educational qualifications.
- **Customer Service Metrics:** The trend continues with PG and above scoring the highest (3.89), then U.G level (3.24), and school level (2.91). The F-value of 15.584 is indicative of significant differences.
- **Regulatory Compliance:** PG and above level exporters give the highest rating (3.80), followed by U.G level (3.41), and school level (2.11). The high F-value of 59.068 reinforces the significant variation across educational qualifications.
- **Innovation and Adaptability:** Exporters with PG and above qualifications rate themselves highest in innovation and adaptability (4.02), followed by U.G level (3.12) and school level (2.54). The F-value of 36.376 indicates a significant difference.
- **Overall Performance:** Similar to individual metrics, PG and above qualified exporters rate their overall performance highest (4.01), followed by U.G level (3.14) and school level (2.46). The F-value of 56.319 strongly suggests significant differences based on educational qualifications.

In all categories, the significance level is 0, strongly rejecting the null hypothesis (H0) and indicating that exporters' opinions about their performance significantly vary based on their level of educational qualification. The data consistently shows that higher educational qualifications correlate with higher self-rated performance across all metrics.

Exporters experience in Spices based Exporters' opinion about their own performance

This table explores the influence of exporters' experience in spice exports on their self-assessed performance. The experience is categorized into three groups: Less than 5 years, 5-10 years, and 11-20 years. The performance metrics analyzed are Quality, Reliability, Customer Service, Regulatory Compliance, Innovation and Adaptability, and Overall Performance.

H_0: Exporters' opinion about their own performance are not significantly affected by differences in their Exporters experience in Spices

Table

Exporters experience in Spices based Exporters' opinion about their own performance

Exporters experience in Spices exports	Less than 5 years	5-10 years	11-20 years	Total	F	Sig.
Quality Metrics	1.78	2.99	3.85	3.12	120.934	0.000
Reliability Metrics:	1.78	2.93	3.92	3.12	118.773	0.000
Customer Service Metrics	2.59	3.42	3.67	3.37	17.492	0.000

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Regulatory Compliance	2.78	2.91	3.86	3.27	32.871	0.000
Innovation and Adaptability	1.78	3.46	3.77	3.28	80.146	0.000
Overall Performance	2.39	3.41	3.53	3.27	26.686	0.000

Source: Computed Data

- **Quality Metrics:** Exporters with 11-20 years of experience rate their quality highest (3.85), followed by those with 5-10 years (2.99), and the lowest scores are from those with less than 5 years of experience (1.78). The very high F-value of 120.934 indicates a statistically significant difference across experience levels.
- **Reliability Metrics:** Similarly, those with 11-20 years of experience give the highest ratings (3.92), followed by the 5-10 years group (2.93), and the least experienced group (1.78). The F-value of 118.773 suggests significant differences based on experience.
- **Customer Service Metrics:** Exporters with 11-20 years of experience again rate themselves highest (3.67), followed by the 5-10 years group (3.42), and those with less than 5 years (2.59). The F-value of 17.492 is indicative of significant differences.
- **Regulatory Compliance:** Exporters with 11-20 years of experience rate the highest (3.86), followed closely by those with 5-10 years (2.91) and less than 5 years (2.78). The F- value of 32.871 reinforces the significant variation across experience levels.
- **Innovation and Adaptability:** Those with 11-20 years of experience score the highest (3.77), followed by 5-10 years (3.46), and the least experienced group (1.78). The F- value of 80.146 indicates a significant difference.
- **Overall Performance:** The trend continues with the most experienced group (11-20 years) rating their overall performance highest (3.53), followed by the 5-10 years group (3.41) and the less than 5 years group (2.39). The F-value of 26.686 suggests significant differences based on experience.

In all categories, the significance level is 0, strongly rejecting the null hypothesis (H0) and indicating that exporters' opinions about their performance are significantly affected by their experience in spice exports. The data consistently shows that more experienced exporters rate their performance higher across all metrics.

Size of the company based Exporters' opinion about their own performance

This table investigates how the size of a company influences exporters' self-assessment of their performance. The companies are categorized based on employee count: Small (1-50 employees), Medium (51-100 employees), and Large (More than 100 employees). The performance metrics evaluated include Quality, Reliability, Customer Service, Regulatory Compliance, Innovation and Adaptability, and Overall Performance.

H_0: Exporters' opinion about their own performance are not significantly affected by differences in their Size of the company.

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Table
Size of the company based Exporters' opinion about their own performance

Size of the company	Small (1-50 employees)	Medium (51-100 employees)	Large (More than 100 employees)	Total	F	Sig.
Quality Metrics	2.96	3.33	3.00	3.12	3.803	0.023
Reliability Metrics:	2.75	3.56	3.03	3.12	17.742	0.000
Customer Service Metrics	3.19	3.58	3.34	3.37	3.841	0.023
Regulatory Compliance	3.13	3.41	3.34	3.27	2.091	0.125
Innovation and Adaptability	2.97	3.53	3.69	3.28	9.521	0.000
Overall Performance	2.99	3.41	4.03	3.27	15.283	0.000

Source: Computed Data

- **Quality Metrics:** Medium-sized companies rate their quality highest (3.33), followed by small (2.96) and large companies (3.00). The F-value of 3.803 with a significance (Sig.) of 0.023 suggests a modest but significant difference across company sizes.
- **Reliability Metrics:** Medium-sized companies again rate themselves highest (3.56), followed by large (3.03) and small companies (2.75). The significant F-value of 17.742 indicates a notable difference between the groups.
- **Customer Service Metrics:** Medium-sized companies score highest (3.58), followed by large (3.34) and small companies (3.19). The F-value of 3.841 with a Sig. of 0.023 points to a significant difference, though relatively small.
- **Regulatory Compliance:** Medium-sized companies rate highest (3.41), followed by large (3.34) and small companies (3.13). However, the F-value of 2.091 with a Sig. of 0.125 suggests that the differences are not statistically significant in this category.
- **Innovation and Adaptability:** Large companies score highest (3.69), followed by medium (3.53) and small companies (2.97). The F-value of 9.521 indicates significant differences between company sizes.
- **Overall Performance:** Large companies rate their overall performance highest (4.03), followed by medium (3.41) and small companies (2.99). The F-value of 15.283 with a Sig. of 0.000 strongly suggests significant differences.

In summary, the table shows varying levels of significance across different metrics. While there are significant differences in most categories, the impact of company size is most pronounced in Overall Performance, Reliability Metrics, and Innovation and Adaptability. The hypothesis (H0) is partially rejected, indicating that the size of a company does have a significant effect on exporters' opinions about their performance in several key areas.

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Legal status of the company based Exporters' opinion about their own performance

This table evaluates the impact of a company's legal status on exporters' self-assessment of their performance. The legal statuses considered are Sole Proprietorship, Partnership, Private Limited Company, and Public Limited Company. The performance metrics include Quality, Reliability, Customer Service, Regulatory Compliance, Innovation and Adaptability, and Overall Performance.

H_0: Exporters' opinion about their own performance are not significantly affected by differences in their legal status of the company

Table

Legal status of the company based Exporters' opinion about their own performance

legal status of the company	Sole Proprietorship	Partnership	Private Limited Company	Public Limited Company	Total	F	Sig.
Quality Metrics	2.57	2.63	3.59	4.03	3.12	35.739	0.000
Reliability Metrics:	2.86	2.76	3.88	2.53	3.12	27.556	0.000
Customer Service Metrics	3.36	3.27	3.50	3.29	3.37	0.673	0.569
Regulatory Compliance	3.42	2.63	3.51	3.76	3.27	15.102	0.000
Innovation and Adaptability	3.12	3.02	3.41	3.82	3.28	4.859	0.003
Overall Performance	3.68	2.88	3.43	3.00	3.27	9.848	0.000

Source: Computed Data

- **Quality Metrics:** Public Limited Companies rate their quality highest (4.03), followed by Private Limited Companies (3.59), Partnerships (2.63), and Sole Proprietorships (2.57). The F-value of 35.739 with a Sig. of 0.000 indicates a statistically significant difference across legal statuses.
- **Reliability Metrics:** Private Limited Companies rate themselves highest in reliability (3.88), followed by Sole Proprietorships (2.86) and Partnerships (2.76), with Public Limited Companies surprisingly rating themselves lowest (2.53). The F-value of 27.556 suggests significant differences.
- **Customer Service Metrics:** The scores are relatively close, with the highest rating from Sole Proprietorships (3.36). The F-value of 0.673 with a Sig. of 0.569 indicates that the differences are not statistically significant in this category.
- **Regulatory Compliance:** Public Limited Companies rate themselves highest (3.76), followed by Private Limited Companies (3.51), Sole Proprietorships (3.42), and Partnerships (2.63). The F-value of 15.102 with a Sig. of 0.000 suggests significant differences.
- **Innovation and Adaptability:** Public Limited Companies score highest (3.82), followed by Private Limited Companies (3.41), Sole Proprietorships (3.12), and Partnerships (3.02). The F-value of 4.859 with a Sig. of 0.003 indicates significant differences.
- **Overall Performance:** Sole Proprietorships rate their overall performance highest

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(3.68), followed by Private Limited Companies (3.43), Partnerships (2.88), and Public Limited Companies (3.00). The F-value of 9.848 with a Sig. of 0.000 indicates significant differences.

In summary, the hypothesis (H0) is rejected for most metrics, suggesting that the legal status of a company does significantly affect exporters' opinions about their performance in various areas. Particularly, Public and Private Limited Companies tend to rate their performance higher in Quality and Regulatory Compliance, while Sole Proprietorships show higher confidence in Overall Performance. The exception is in Customer Service Metrics, where the differences are not statistically significant.

Correlation between exporters' challenges and their performance in spices export business

The table presented is a statistical analysis of the relationship between various types of challenges businesses might face and several performance metrics. Pearson correlation coefficients have been calculated to measure the strength and direction of the linearrelationship between the challenges and the performance metrics. The significance of these correlations has been tested with a 2-tailed significance level, and the sample size for each correlation is 283 observations.

Table

Correlations							
		Quality Metrics	Reliability Metrics:	Customer Service Metrics	Regulatory Compliance	Innovation and Adaptability	Overall Performance
Regulatory Challenges	Pearson Correlation	-.751**	-.688**	-.657**	-.779**	-.617**	-.525**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000
	N	283	283	283	283	283	283
Financial Challenges	Pearson Correlation	-.518**	-.579**	-.505**	-.416**	-.461**	-.565**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000
	N	283	283	283	283	283	283
Logistical Challenges	Pearson Correlation	-.637**	-.644**	-.641**	-.488**	-.660**	-.509**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000
	N	283	283	283	283	283	283
Market Challenges	Pearson Correlation	-.455**	-.643**	-.744**	-.612**	-.580**	-.448**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000
	N	283	283	283	283	283	283

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Political and Economic Challenges	Pearson Correlation	-.381**	-.502**	-.317**	-.569**	-.496**	-.560**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000
	N	283	283	283	283	283	283
Technological Challenges	Pearson Correlation	-.477**	-.609**	-.496**	-.463**	-.616**	-.395**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000
	N	283	283	283	283	283	283
**. Correlation is significant at the 0.01 level (2-tailed).							

Interpretation

In analyzing the correlation between different challenges and overall performance, we look for the highest negative Pearson correlation coefficients, as these indicate a strong inverse relationship, suggesting that as challenges increase, overall performance is likely to decrease.

- Regulatory Challenges: Shows a moderately strong negative correlation with overall performance (r = -0.525). This indicates that increased regulatory challenges are associated with decreased overall performance.
- Financial Challenges: Has a moderate negative correlation with overall performance (r = -0.565). This implies that financial challenges are likely to be associated with lower overall performance.
- Logistical Challenges: Demonstrates a moderate negative correlation with overall performance (r = -0.509). This suggests that greater logistical challenges are likely to correspond with lower performance.
- Market Challenges: Exhibits a moderate negative correlation with overall performance (r = -0.448). This indicates that market challenges have a significant but slightly lesser negative impact on performance compared to other factors.
- Political and Economic Challenges: Shows a moderate negative correlation with overall performance (r = -0.560). This means that as political and economic challenges increase, overall performance is likely to decrease.
- Technological Challenges: Has a relatively lower negative correlation with overall performance (r = -0.395) compared to other challenges. This suggests that while technological challenges do impact performance negatively, the effect is less pronounced than other challenges.

Based on the strength of the correlation coefficients, Financial Challenges have the highest negative correlation with overall performance, followed closely by Political and Economic Challenges, and Regulatory Challenges. It's important to note that all correlations are significant at the 0.01 level, indicating a high level of confidence in the results.

The negative correlations across the board suggest that an increase in any of these challenges is detrimental to the various metrics of performance, with financial, political, economic, and regulatory challenges having the most substantial impact.

SEM between Spices Exporters' Challenges and their own performance

The analysis presented here utilizes Structural Equation Modeling (SEM) to

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investigate the relationship between the challenges faced by spice exporters and their own performance. SEM is a comprehensive statistical approach that allows for the examination of complex relationships between observed and latent variables. In this context, the study focuses on testing two hypotheses:

Null Hypothesis (H0): Spices Exporters' Challenges have no impact on their own performance.

Alternative Hypothesis (Ha): Spices Exporters' Challenges negatively impact their own performance.

Table
Regression Weights

Path			Standardized Estimates	Un-Standardized Estimate	S.E.	C.R.	P	Ha
Exporters Performance	<---	Challenges of Spices Exporters	-.96	-1.141	.097	-11.756	***	Support

The results of the SEM are summarized in the Regression Weights table, providing both standardized and un-standardized estimates, along with standard errors, critical ratios (C.R.), and p-values.

Path and Estimates:

The path from "Challenges of Spices Exporters" to "Exporters Performance" has a standardized estimate of -0.96 and an un-standardized estimate of -1.141. These figures indicate a strong negative relationship between the challenges faced by exporters and their performance.

Standard Error (S.E.) and Critical Ratio (C.R.):

The standard error of the estimate is 0.097, and the critical ratio is -11.756. The critical ratio, a measure of the significance of the path coefficient, is quite high in absolute terms, suggesting a significant relationship.

P-value:

The p-value is marked as ".000", indicating a value less than 0.001, which is statistically highly significant. This strongly supports the rejection of the null hypothesis (H0) and favors the alternative hypothesis (Ha).

Support for Alternative Hypothesis (Ha):

Given the strong negative standardized estimate, the high critical ratio, and the highly significant p-value, the results support the alternative hypothesis. This suggests that challenges faced by spice exporters significantly and negatively impact their performance.

The SEM analysis provides clear statistical evidence that challenges encountered by spice exporters have a significant and negative impact on their performance. This implies that factors such as regulatory hurdles, financial constraints, logistical issues, and market dynamics are not merely operational obstacles but have profound effects on the overall performance and sustainability of businesses in the spice export sector. These insights could be crucial for both policymakers and business leaders in strategizing for the improvement and support of the spice export industry.

SUGGESTIONS

Based on the comprehensive analysis of the data on spice exporters' challenges,

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performance, and perceptions towards the World Trade Organization (WTO), here are some suggestions for both the WTO and exporters in the spice trade:

Suggestions for the World Trade Organization (WTO):

1. Simplification of Tariff Structures: The WTO should prioritize efforts to harmonize and reduce tariff structures globally, as this is strongly desired by exporters for enhanced competitiveness.
2. Streamlining Quality Standards: Focus on establishing uniform quality standards and offering accreditation support to exporters, which will facilitate compliance and enhance product appeal in international markets.
3. Enhancing Trade Facilitation: The WTO should work towards simplifying documentation processes and developing efficient transit agreements to ease the complexities and costs of international spice trade.
4. Expanding Market Access: Organize and sponsor international trade fairs and missions to assist exporters in showcasing their products and accessing new, untapped markets.
5. Improving Dispute Resolution: Strengthen the efficiency of dispute resolution mechanisms and provide legal support or advisory services to help exporters navigate international laws and WTO norms.
6. Support for SMEs: Implement targeted financial aid programs and capacity-building initiatives for SMEs in the spice export sector to help them meet international standards and adapt to market trends.
7. Transparency and Information Sharing: Enhance the availability and accessibility of up-to-date market data and regulatory updates to support informed decision-making by exporters.

Suggestions for Exporters in the Spice Trade:

1. Pursuing Diverse Certifications: While ISO certification is prevalent, exploring a wider range of certifications can open new market opportunities and showcase a commitment to quality and sustainability.
2. Optimizing Export Modes: While sea transport is dominant, exploring other modes like air or multimodal logistics can offer competitive advantages in terms of speed or access to different markets.
3. Diversifying Sourcing Strategies: Broaden sourcing methods beyond wholesale markets to include direct sourcing from producers or collaborating with other exporters, enhancing product variety and supply chain resilience.
4. Adopting Varied Payment Terms: While the Letter of Credit is preferred, being open to other secure payment terms could facilitate smoother transactions and attract a broader range of international buyers.
5. Investing in Quality and Reliability: Focus on continuous improvement in meeting international standards and ensuring the reliability and safety of products.
6. Enhancing Customer Service: Strive for flexibility in payment and delivery options and maintain effective dispute resolution processes to build strong customer relationships.
7. Staying Informed and Compliant: Regularly update knowledge on trade regulations and remain adaptable to legal changes to ensure compliance and operational efficiency.
8. Leveraging Technology and Innovation: Actively adopt new technologies to improve operational efficiency and adapt products based on market trends and

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customer feedback.

9. Experience and Education in Performance: Recognize the value of experience and education in enhancing business performance. Encourage continuous learning and skills development among staff.

For both the WTO and Exporters:

1. Collaborative Efforts: The WTO and exporters should collaborate on initiatives such as training programs, market research, and policy development to mutually enhance the global spice trade ecosystem.
2. Feedback and Continuous Improvement: Regular feedback mechanisms can be established for exporters to voice their concerns and suggestions, helping the WTO to align its policies more effectively with on-ground realities.

These suggestions aim to foster a mutually beneficial relationship between the WTO and exporters, enhancing the global competitiveness and sustainability of the spice trade.

CONCLUSION

India, historically renowned as the land of spices, continues to hold a prominent position in the global spice market. Tamil Nadu, in particular, emerges as a significant contributor, exporting a diverse array of spices to various countries. These exports not only include popular items like cardamom, turmeric, and pepper but also encompass a range of other spices that are integral to culinary traditions worldwide. The state's rich agro-climatic conditions and traditional expertise in spice cultivation have enabled it to carve out a substantial niche in the international spice trade. This not only bolsters India's export economy but also preserves and promotes the rich heritage associated with Indian spices.

The World Trade Organization plays a crucial role in shaping the global trade landscape, particularly for commodities like spices. By fostering an environment of open and fair trade, the WTO aids in streamlining processes, mitigating trade-related conflicts, and establishing global standards. Its influence in simplifying tariff structures and streamlining quality standards greatly impacts the ease and viability of exporting spices from regions like Tamil Nadu. The WTO's efforts in facilitating market access and dispute resolution further enhance the prospects for spice exporters, providing them with a platform to compete and thrive in the global market.

The analysis of the spice export sector from Tamil Nadu reveals several critical findings, particularly for small exporters. These businesses are significantly influenced by environmental factors, legal frameworks, and international policies. It is imperative for these smaller entities to closely monitor and adapt to the dynamic global trade environment. By implementing targeted strategies and recommendations - such as staying informed about WTO policies, embracing technological advancements, and engaging in collaborative efforts for market access and quality standardization - small exporters can significantly enhance their competitiveness. Adherence to environmental sustainability practices and compliance with international legal standards will further enable these businesses to navigate the complex web of global trade more effectively.

The growth of the spice sector in India, and specifically in Tamil Nadu, presents numerous benefits. It not only contributes significantly to the country's export revenues but also plays a vital role in the socio-economic development of the region. The expansion of the spice trade offers opportunities for employment, promotes rural development, and contributes to the overall economic growth of the country. Furthermore, the success of the spice export industry enhances India's international reputation as a reliable and quality supplier of spices, strengthening its position in the global market. The continued growth of

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this sector, supported by informed strategies and compliance with international standards, promises to bring prosperity and recognition to India's spice exporters.

In conclusion, the spice export industry in Tamil Nadu, underpinned by India's rich heritage in spice cultivation, stands at a pivotal juncture. The collaboration with organizations like the WTO, adherence to global standards, and the adoption of innovative practices are key to harnessing the full potential of this sector. By embracing these elements, Tamil Nadu's spice exporters can look forward to a future of sustained growth and enhanced global presence.

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