Measuring the Degree of Internationalization (DOI) of Indian Manufacturing Companies

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Abstract

Many Indian companies from manufacturing sectors such as industrial, consumer discretionary, and materials have forayed into international markets through exports, overseas ventures, mergers and acquisitions (M&As), joint ventures, etc. Still, there remain unanswered findings to be gained from new research to measure the degree of internationalization (DOI) of international business operations by applying an index, for the first time, to Indian manufacturing companies. Moreover, existing studies, predominantly emanating from developed economies, have explored DOI in the context of developed economies. The extant approaches are limited because explaining the phenomenon of measuring the DOI of firms from emerging economies using frameworks designed for companies in developed countries may lead to incorrect results, as they are characterized by institutional voids like poor governance, greater governmental control, and nascent institutions. This original empirical investigation researched vital phenomena pertaining to Indian manufacturing companies by addressing the gaps outlined above. Researchers can cite germane measures of DOI via the proposed index to support academics and practitioners to determine whether a specific Indian manufacturing company has recently ventured into or plans to launch into the international markets by employing a more thorough composite measure of DOI.

Keywords : **Degree of internationalization, Indian manufacturing firms, multinational, foreign direct investment, emerging economies, strategic management**

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Indian manufacturing firms are playing a significant global role by foraying into international markets through exports, overseas ventures, joint ventures, and acquisitions. The manufacturing sector in India contributed around 40.7% of India's total OFDI during the period from 2008 – 2018 (Joseph, 2019). India's evolution in growth and nature of outward foreign direct investment (OFDI) in the context of internationalization of developing economies holds utmost significance as it has emerged as an important source of OFDI, particularly after the introduction of economic reforms in 1991 (Chaudhry et al., 2018). The array of internationalization

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strategy options accessible to the firms has resulted in varying degrees or levels of success and impact in their internationalization journey. Therefore, to study the patterns and impact of the global strategies on the firms' performance, it is necessary to evaluate the firms' degree or level of internationalization.

Even though there exists an extensive literature on international markets, the research studies into the internationalization of Indian manufacturing firms are very limited and narrow in scope and are focused on a specific segment or an aspect of internationalization of the companies (Rana et al., 2018). There is a need to study different forms of outward internationalization of Indian manufacturing companies, for example, the extent of research and development intensity, foreign capital employed, international acquisitions, etc., to get more realistic information regarding different aspects of internationalization of Indian manufacturing companies. The present study is an original effort to cover an unexplored area and build on the previous literature pertaining to internationalization, having Indian multinational companies (MNCs) as exemplars. This study also endeavors to collect and analyze data at the firm level with the perspective of CEOs/CXOs on the internationalization of Indian manufacturing companies, which was missing in the previous studies. This exploratory research into new facades of the internationalization of Indian manufacturing companies seeks results helpful to companies from India and other emerging markets. For instance, if a company wishes to calculate its DOI and see where it stands vis-à-vis other sampled companies, it can get valuable information.

Literature Review

Internationalization of a Firm and Its Measures

The process of internationalization typically involves multinationals' gradually increasing involvement in foreign markets, often starting with a basic sales office and ending up producing abroad in more advanced stages (Johanson & Vahlne, 1977). A firm can enter the foreign markets through exports, overseas ventures, joint ventures, M&As, etc. Therefore, to calculate the DOI of a firm, it is required to identify the relevant measures and determine ways of interpreting them to measure the firm's DOI.

Internationalization based only on exporting products does not consider the involvement of resources necessary for their production abroad (Jankowska, 2011) and so is an incomplete approach. Future global businesses require a non-traditional style and a creative approach, therefore, firms should accordingly orient strategic decisions of their businesses, keeping in mind the emerging trends (Subramaniam, 2016). The realization of internationalization strategy involves other aspects which are necessary to launch a firm from the domestic market to other countries.

Scholars have used many different measures over the years for measuring the DOI of a firm. Table 1 is a summary of empirical studies and the variables used for measuring internationalization by some of the researchers (Altaf & Shah, 2015; Gaur & Kumar, 2009; Ghimire, 2018; Mroczek - Dąbrowska, 2016; Shih-Yung et al., 2019; Singla & George, 2013; Sullivan, 1994). Some of the studies listed have been in the context of the Indian manufacturing companies (Altaf & Shah, 2015; Gaur & Kumar, 2009). However, these used only a single-item scale, that is, foreign sales as a percentage to total sales (FSTS), for measuring internationalization. Despite the ease of calculation, a single-item scale usually underperforms multi-item scales in terms of predictive ability, while multi-item scales reduce measurement errors, resulting in increased reliability and construct validity (Ramsey et al., 2013). One of the studies in the context of Indian firms (Singla & George, 2013) measured DOI using four variables, namely FSTS, FATA, OSTS, and Scope, however, the sample studied was for the period from 2002 – 2008, that is, before the global financial crisis. The current study focuses on the period from 2012 – 2015, which is after the crisis (when the global economy stabilized). There is also a need to consider a few other measures such as foreign equity commitment (FETE), foreign profit as a percentage to total profit (FPTP), international

Table 1. ***Summary of Empirical Studies and the Variables Used to Measure Internationalization***

Studies on Internationalization	Sample Used	Variables Used to Measure Internationalization
Sullivan (1994)	74 American manufacturing companies	*FSTS, FATA, TMIE, PDIO, OSTS*
Gaur & Kumar (2009)	Indian manufacturing and services,1997–2001	*FSTS*
Singla & George (2013)	232 Indian firms	*FSTS, FATA, OSTS, Scope*
Altaf & Shah (2015)	180 Indian manufacturing firms, 2010–2015	*FSTS*
Mroczek - Dąbrowska (2016)	73 Polish industries, 2010–2012	*FSTS, CI, EMD, SFA*
Ghimire (2018)	40 Chinese companies, 2014–2016	*FSTS, OSTS, FATA, GTA*
Shih-Yung et al. (2019)	924 enterprises from Taiwan, 2001–2017	*FSTS, RDI, AI, FPTP, ESTS*

Note. *OSTS* – Overseas subsidiaries as a percentage to total subsidiaries, *EMD* - Entry mode dominant characterized by willingness of the companies to undertake equity commitment, *CI* - Companies' internationalization ratio, *Scope* - Geographic dispersion expressed as a proportion of the highest number of countries with subsidiaries represented in the sample in a given year.

experience of the top management engaged in the process of internationalization, advertising intensity (AI), psychic dispersion of international operations (PDIO), etc. which were not studied earlier in the context of measuring DOI of Indian companies. However, scholars have studied these measures (Mroczek - Dąbrowska, 2016; Ramsey et al., 2013; Shih-Yung et al., 2019; Sullivan, 1994) in the context of firms from developed nations to measure DOI and showed a positive correlation with the firms' performance measures. Further, the previous studies in the Indian context have also not covered the views and outlook of the CEOs and CXOs who are important decision-makers in the firms' internationalization process. This research gap has been bridged in the current study.

As the choice of relevant measure seems to depend upon the context of the study, it was felt necessary to understand the trends of OFDI from India to identify the measures covering different aspects of internationalization of Indian firms.

Trends of Indian OFDI

The review of literature available on OFDI reveals that some Indian business conglomerates like Tata, Birla, and Kirloskar have been investing abroad since the 1960s in cross-border activities to expand their production bases (Chaudhry et al., 2018). The initial phases of investment were in the forms of export of machinery, technical know-how (i.e., non-cash). During this phase, only limited cash transfers were allowed, for example, for initial expenses in setting up the overseas operations (Pradhan, 2008). In the post-liberalization period in the 1990s, many Indian firms engaged in overseas M&As and strategic alliances to gain competitive advantage in terms of technology, brand, goodwill, or intellectual property rights, for example, Tata Tea acquired Tetley Tea to access the Tetley brand name and market, while WIPRO acquired Nerve Wire Inc. (USA) in 2003 to secure deep domain knowledge and other IT related benefits (Chaudhry et al., 2018; Lohani & Bhatia, 2017).

Thomas and Narayanan (2017) found that R&D investments and imports of technology in the form of capital goods played important roles in both the probability of undertaking OFDI. Another interesting feature of India's OFDI is reflected in the enhanced risk appetite and confidence of Indian firms to invest overseas by seeking majority ownership in foreign affiliates (Chaudhry et al., 2018). The strategic asset-seeking Indian firms have increasingly tried to expand their presence in developed foreign markets through M&As and greenfield investments in developing nations with an aim to acquire complementary foreign assets, natural resources, and

the market distribution system (Chaudhry et al., 2018; Kaushal, 2018). The economic reforms along with the magnitude have also changed the geographical spread. While the United Kingdom (UK) and the United States (US) had been attractive destinations for India's OFDI in the initial phase, its focus shifted to Europe, Mauritius, Singapore, United Arab Emirates (UAE), and Netherlands from 2014–15 onwards as these nations address concerns of double-taxation avoidance, offer low tax rates, and provide access to international financial markets to overseas investors from India (Chaudhry et al., 2018).

Thus, several studies cited long-term growth plans through the acquisition of strategic resources, majority ownership in foreign affiliates, market-base expansion, technological advancement, and research and development efforts as important factors for the internationalization of Indian firms. Therefore, in the current study, we have studied the measures covering these aspects of the internationalization of Indian firms.

Model to Measure the DOI

Operationally, many ways exist to measure the DOI (Verbeke et al., 2010). However, Sullivan's (1994) measure is one of the few that combined the main dimensions of internationalization, namely structural, performance, and attitudinal, into one measure and was empirically validated by factor analysis. Structural indicators usually present a static picture of an aspect of a firm's activity from the internationalization degree perspective (e.g., a number of foreign subsidiaries or countries of operation). Performance indicators show the effects of a firm's internationalization in a certain field (e.g., total income from foreign subsidiaries), while attitudinal indicators represent the attitudes and behaviors of managers in the context of international activities (e.g., international experience of the top managers measured in years of working abroad) (Szymura - Tyc, 2013).

Sullivan (1994) identified nine measures, namely FSTS, export sales as a percentage of total sales (ESTS), FPTP, FATA, OSTS, top management international experience (TMIE), RDI, advertising intensity (AI), and psychic dispersion of international operations (PDIO). The data for each measure were collected from a variety of archives for 74 American manufacturing MNCs. Cronbach's alpha, factor analysis, and frequency analysis revealed a linear combination of five measures, namely FSTS, FATA, OSTS, TMIE, and PDIO, with a reliability coefficient of .79 as a unidimensional measure of the DOI of a firm termed as DOI_{INTS}. Many studies have used variations of Sullivan's (1994) DOI_{INTS} index for measuring internationalization (Ghimire, 2018; Mroczek-Dąbrowska, 2016; Ramsey et al., 2013; Singla & George, 2013; Szymura-Tyc, 2013).

Sullivan's model has been criticized for combining measures of different levels, that is, structural and attitudinal, as well as performance-related indicators of internationalization (Ramaswamy, 1996). According to him, components of the different levels were no substitutes as conveyed by the index, being the sum of all components. A high value of one parameter could not simply be replaced by a high value of another variable regarding the different outcomes on the part of a dependable variable. However, Sullivan (1996) maintained the usefulness of a multi-item index, provided it adequately addressed construct validity and item validity issues. Multi-item indices allow for the inclusion of non-performance variables when assessing internationalization.

To conclude, one might say that internationalization is a multi-dimensional concept, as a number of variables can be used to operationalize its measurement. With regard to the selection of a variable and rules for the construction of an index for measuring DOI, multi-item indices are considered to be more dependable than single measures, as they allow for the inclusion of non-performance variables when constructing the internationalization index leading to a fine-grained assessment of internationalization (Dörrenbächer, 2000). Consequently, in constructing measures for the DOI, researchers have used ratios that measure the percentage of a firm's activities initiated or oriented internationally to the total activities of a firm. The main attributes identified in the literature include structural, attitudinal, and performance.

Research Gaps

The intensive globalization processes over the decades have resulted in many scholars (Ghimire, 2018; Mroczek - Dąbrowska, 2016; Ramsey et al., 2013 ; Shih-Yung et al., 2019; Syzmura - Tyc, 2013) to explicate their understanding of "internationalization" by quantitative means and by using better qualifying underlying factors. The common objective in these investigations was to establish an appropriate model to arrive at the DOI of a firm and study its effect on its performance, thereby creating a tool for decision-makers. However, there is no commonly accepted model for decision-makers to be found in the literature that can be used to measure the DOI of a firm standing separate and independent from its interior activities. Correspondingly, in the majority of the literature studied, the measurement models applied to the internationalization of firms located originated in developed economies, without the necessary related consideration of emerging economies, suggesting a deficiency in economic segmentation at a national level.

Herein, the inferences drawn from contemporary measurement models suitable to assess DOI in developed countries mismatch against the true specificities of emerging economies, thereby nurturing improper results, as a robust eco-system for trade is imperative for the growth and development of a country (Manthri et al. 2015). Khanna and Palepu (2000) pointed out that India as an emerging economy vis-à-vis developed countries presents separate issues owing to poorer governance, greater governmental control, and nascent entrenched institutionalization.

India presents a prime example of an emerging economy to build and test a foundation model assessing internationalization applicable to emerging countries by using new and more apt approaches. However, studies listed in the context of the Indian manufacturing companies (Altaf & Shah, 2015; Gaur & Kumar, 2009) have used only a single-item scale, that is, foreign sales as a percentage to total sales (FSTS), for measuring internationalization. Despite the ease of calculation, a single-item scale usually underperforms multi-item scales in terms of predictive ability, while multi-item scales reduce measurement errors, resulting in increased reliability and construct validity (Ramsey et al., 2013). Therefore, there is a need to consider a few other measures in the context of Indian manufacturing companies. Lack of adequate research and paucity of literature on the various measures and indices to arrive at the DOI in the context of Indian manufacturing is the motivation for undertaking this research in the Indian context.

Research Questions and Objectives

A comprehensive literature review and the research gaps raise the following questions :

(1) Do measures exist to determine the variability of the DOI of Indian manufacturing companies?

(2) Can the offered index be used to quantify DOI measures to determine the variability of the DOI within Indian manufacturing companies?

The research questions result in the following research objectives :

(1) To identify the relevant measures based on the extant literature studied and empirically assess through exploratory research these identified measures for their reliability and validity using quantitative analysis.

(2) Develop and propose an index using apposite measures identified and advanced for measuring the DOI of Indian manufacturing firms.

(3) Classify the Indian manufacturing firms in the sample as high or low potential on DOI, using the developed index.

Research Methodology

Research Design

The aim, theoretical approach, and objectives inherent in this empirical investigation required a research strategy capable of determining the measures for DOI of a firm and arriving at an index of DOI. Therefore, exploratory research and quantitative analysis techniques are used in the current study.

Exploratory research through focus group discussions (FGD) was conducted, and the qualitative inputs from FGD and pre-existing studies provided preliminary information that was invaluable in designing the semi-structured quantitative research tool (corporate questionnaire). The corporate questionnaire was validated and accepted by four industry experts and was also pretested with nine practitioners who were CEOs/CXOs of firms. Recommendations from experts were processed after effecting necessary modifications, and then the final version was accepted. The questionnaire consisted of questions relating to information on the company's internationalization, nature of business, the form of ownership, geographical presence, international acquisitions, expenditure relating to R&D and advertising, TMIE, FMTM, foreign revenues, return on capital employed, foreign assets, and certain other factors related to identifying the measures of DOI of Indian manufacturing companies.

Quantitative research was then carried out using an interview technique by administering the semi-structured corporate questionnaire to the CEOs/CXOs of the Indian manufacturing companies in the final sample to obtain their assessment on the identified measures of DOI in the context of Indian manufacturing companies.

The respondents' profile is provided in Table 2. The interviews were conducted in person or over the telephone after a prior appointment. A typical interview took about 60 – 75 minutes, and the entire process of data collection for the 34 Indian manufacturing companies was completed over a period of six months.

The quantitative research also involved collecting data from secondary sources such as the Bloomberg database and annual reports to get details on the companies' financial performance included in this research pertaining to identified measures of DOI. The identified measures were then evaluated using various statistical techniques such as factor analysis, Cronbach's alpha, and normality of distribution available in the SPSS 25 version to test the reliability and validity of the measures for constructing the index of DOI of Indian manufacturing companies.

Table 2. ***Profile of the Respondents***

Profile of Respondents	Median (No. of years)	Std. Deviation (No. of years)
Average age	54	8.42
Average no. of years in current company	15	11.58
Average no. of years in current role	6	6.45
Average no. of years in leadership roles	8	8.45

Research Variables

The selection of variables in the current study differs from Sullivan's (1994) list of variables. At the beginning of his study, Sullivan shortlisted nine variables for analysis, while we identified 12 variables initially in the context

of Indian manufacturing companies. These emerged from literature review, discussions with industry experts, and CEO/CXO interviews.

Eight variables, namely FSTS, FATA, RDI, AI, FPTP, TMIE, PDIO, and ESTS, were retained from Sullivan's study, while four variables, namely FCETCE, FETE, NNIE, and FMTM, were different. The reasons for identifying the initial 12 variables are as follows :

- **FSTS and FATA :** These two variables are the most commonly applied measures of a company's international activity in previous literature (Altaf & Shah, 2015; Ghimire, 2018; Shih-Yung, 2019) and are also relevant for this study.

- **RDI, AI, FCETCE, and FETE :** As per the literature reviewed, many Indian manufacturing companies are still in relatively early stages of their internationalization journey. Therefore, many companies have made financial investments in terms of capital employed, equity contribution, overseas R&D, and advertising efforts. Hence, these variables are important for measuring the DOI of Indian manufacturing companies.

- **ESTS :** Thomas and Narayan (2011) discovered a link between OFDI and prior export performance of Indian manufacturing firms, as firms with export experience are likely to have more knowledge of the foreign markets, distribution networks, customer tastes and preferences, and foreign country institutional mechanisms. Therefore, the variable ESTS is considered for this study as it is likely to influence the internationalization degree of firms.

- **FPTP :** Indian firms face certain cost disadvantages such as liability of foreignness and newness, resulting in a decrease in profitability, mainly in the initial phases of their internationalization process. As many Indian manufacturing firms are in their nascent stage, the FPTP variable is considered relevant for this study.

- **TMIE :** The top management of a company can directly influence the strategic decision-making process, which can eventually impact the firm performance (Cavusgil et al., 2012). So, the international experience of top managers plays a vital role in the firm's internationalization process.

- **PDIO :** The liability of foreignness (LOF) is an important factor in the success of the internationalization journey of MNCs, as LOF is an inherent disadvantage that MNCs face in host countries because they have to deal with the differences in regulation, language, culture, and norms, which results in additional challenges leading to an increase in their internationalization costs and a competitive disadvantage that needs to be overcomed. The leading destinations for India's outward FDI are Europe, Singapore, Mauritius, Netherlands, UAE, US, and UK (Chaudhry et al., 2018). Therefore, it is important to study how psychically diverse the firms' operations are.

- **NNIE, FMTM :** Some Indian multinationals are making significant contributions to the host economies in which they operate. For instance, Indian FDI projects in the US created about 60,000 jobs with an investment worth $26.6 billion. Indian firms are the second-highest foreign employers in Britain, with Tata Group, which acquired Tetley Tea and Jaguar Land Rover being UK's biggest manufacturing employer, employing 50,000 employees (Thite et al., 2016). Therefore, the two variables, NNIE and FMTM, are considered important for the current study.

Thus, a total of 12 measures encompassing the three key attributes, namely performance, structure, and attitudinal measures, are initially identified as relevant measures for measuring the DOI of Indian manufacturing companies and are presented in Table 3. These 12 measures are evaluated for their reliability and internal consistency. The analysis and results of the evaluation have been discussed in the next section of this study.

Table 3. ***Twelve Measures of DOI of Indian Manufacturing Companies***

S.No.	Attribute	Research Variables Identified	Operationalization of Variables
1	Performance	*FSTS*	The ratio of foreign sales to total sales.
2		*RDI*	The ratio of foreign research & development expenses to total research & development expenses.
3		*AI*	The ratio of foreign advertising expenditure to total advertising expenditure.
4		*FCETCE*	The ratio of foreign capital employed to total capital employed.
5		*FETE*	The ratio of foreign equity to total equity.
6		*ESTS*	The ratio of exports sales to total sales.
7		*FPTP*	The ratio of foreign profits to total profits.
8	Structure	*FATA*	The ratio of foreign assets to total assets.
9		*TMIE*	The ratio of total years of international work experience to total years of work experience of top management.
10		*FMTM*	The ratio of foreign manpower (employees) to total manpower (employees).
11	Attitude	*PDIO*	Geographic dispersion of the overseas subsidiaries of a firm among the 10 psychic zones of the world.
12		*NNIE*	The total number of nationalities of international employees. An indication of the diversity of foreign employees.

Sample Size

The sample size in the study consists of 34 Indian manufacturing companies which provided adequate diversity

Table 4. ***Manufacturing Companies Included in the Final Sample According to GICS***

GICS Sectors	Total Companies	GICS Industry Name	Total Companies
Consumer Discretionary	15	Auto Components	7
Industrials	11	Machinery	5
Materials	8	Chemicals	5
Total	**34**	Textiles, Apparel, & Luxury Goods	3
		Automobiles	3
		Metals & Mining	2
		Industrial Conglomerates	2
		Construction & Engineering	2
		Personal Products	1
		Paper & Forest Products	1
		Household Durables	1
		Electrical Equipment	1
		Building Products	1
		Total	**34**

in terms of type and nature of the industry, size, years in international markets, focus on acquisitions, etc. and belonged to three Global Industry Classification Standard (GICS)[1] structures, namely consumer discretionary, industrials, and materials and 13 GICS industry types as presented in Table 4. The manufacturing companies included in the final sample were arrived at through a nonprobability purposive sampling method explained in the next section.

Sampling Frame

Doing research in the context of emerging countries can be challenging. The issue of heterogeneity of emerging markets makes generalization difficult (Gammeltoft et al., 2010). We decided to focus on firms from only one emerging country in this study to respond to this problem. During the last many years, India has experienced rapid internationalization and is one of the BRICS countries with a large number of finalized overseas deals and high levels of successful integration of foreign operations (UNCTAD, 2017). Further, outward FDI in the manufacturing sector is crucial for expanding the outreach of Indian manufacturing in the global economy. Therefore, this research has focused on the manufacturing companies in India with greater emphasis on engineering-oriented industries.

The method used for the selection of the firms is based on non-probability purposive sampling, and the sampling frame was arrived as below :

- A list of the top 500 companies listed on the Bombay Stock Exchange (BSE) was taken as also available from the Bloomberg database. The companies from non-manufacturing sectors such as software, ITES, consumer finance, financial services, infrastructure, banking, insurance, etc., were filtered out from this list. Thus, the total number of 500 companies was reduced to about 200 companies.

- We then looked for the contribution of FSTS, as a company's international sales are an important indicator of the company's involvement in the foreign market. Also, FSTS has been a common measure of internationalization in previous studies (Altaf & Shah, 2015; Gaur & Kumar, 2009). The cut-off was taken at around 4% of FSTS. Thus, the total number of 200 manufacturing companies was reduced to about 100 after eliminating companies with a very low priority for international sales and were predominantly domestic market focused.

- From the 100 companies, the companies that were in non-engineering-oriented manufacturing or pharma or textiles sector studied by other authors or companies in project-oriented businesses were removed, and a shortlist of 60 target companies was arrived at fulfilling the sample inclusion criteria.

- Out of the 60 shortlisted manufacturing companies, some were not willing to participate in the study for reasons of confidentiality or other priorities. Thus, the final sample arrived at consisting of 34 Indian manufacturing companies.

Data Collection

The primary data consisted of views and outlooks of the CEOs /CXOs collected through a semi-structured corporate questionnaire using interview technique. The data for the secondary analysis was the financial data of the companies for three financial years: 2013, 2014, and 2015, as available from the Bloomberg database

[1] GICS is a four-tiered, hierarchical industry classification system developed by Morgan Stanley Capital International and Standard & Poor's.

and the companies' annual reports and information in the public domain. The data for these three years were considered for this study as the world had seen a severe global economic meltdown, bank collapses, financial crisis, protectionism, etc., during 2008–10, after which the global economy relatively stabilized in 2010–11. Many Indian MNCs were also impacted during this crisis. As per the data on OFDI from India for the period from April 2007 – May 31, 2011, as published by RBI in their press release dated June 22, 2011 (Reserve Bank of India, 2011), the OFDI contributed by Indian firms in 2010 – 11 was USD 9.3 billion in the form of equity, USD 7.3 billion in loans, and USD 27.2 billion in the form of guarantees. The OFDI during 2007– 08 was USD 20.9 billion, which was more than twice the amount invested by Indian firms before the global crisis in 2007 – 08. Post-crisis, OFDI dipped to USD 17 billion in 2008 – 09 and 2009 – 10 before soaring to a record high of USD 43 billion in 2010–11, with most of the outgo being in the form of guarantees to offshore investment companies. The global crisis caused Indian OFDI flows to fall from their high in 2007, mainly because Indian MNCs had borrowed heavily in dollars to finance mega cross-border M&As, and the effects of which lasted until 2012 (Baskaran & Chaarlas, 2012). The three years that have been studied are post a reasonable economic recovery, and we felt that this period is essential for the study.

Also, the reason for taking only three years' data and averaging it for each measure is to ensure that the data was smoothened for any windfall business or any adverse impact in any particular year. This also helped to control if there was any change in forex rates, accounting standards, one-time events, etc. Further, the performance metrics for measures of DOI for any particular company are likely to be somewhat consistent across a period of time unless there has been some major acquisition or disinvestment or mergers. Hence, the three-year data can be relied upon while studying the sample companies in the research. However, the data for certain measures such as FMTM, NNIE, PDIO, TMIE were taken as applicable for 2014 – 15 for reasons of recency and data availability.

Analysis and Results

Evaluation Criteria for Arriving at the Seven Relevant Measures of DOI

To determine the reliability and construct validity of the 12 variables identified initially, factor analysis was conducted using the SPSS 25 version by performing the principal component analysis (PCA) to examine the degree of internal consistency of a set of items in a measure and determine whether the observed measures should be retained or discarded. PCA is suggested for data reduction (Hair et al., 1998) as it transforms a large set of variables into a smaller one while still containing most of the information in the large set.

The other decision to make while performing factor analysis is the number of factors to be extracted. One standard method applied for this is to choose factors with an Eigenvalue of more than one. This method is also known as Kaiser's criterion (Hair et al., 2006). Thus, those factors get excluded, which explain less variance than one single variable (Bryman & Cramer, 2002). Therefore, factor analysis was considered a suitable technique in the current study to identify vital factors from multiple variables. This would provide preliminary insights for validating measures by offering information on whether or not the variables load on the appropriate factors and if the factors are distinct and potentially represent separate concepts by not having cross-loadings.

The Kaiser – Meyer – Olkin test gave a high meritorious value of 0.802 (.70 to .80 is adequate) and rated as “Great” (Field, 2009), clearly supporting the adequacy of the sample for performing factor analysis. Further, Bartlett's test of sphericity is significant (X^2: 482.941, *df*: 66, Sig.: 0.000), indicating that the correlation matrix is not an identity matrix and, therefore, the data were suitable for factor analysis.

Factor analysis results in seven measures, namely FSTS, RDI, FATA, FCETCE, AI, FETE, and FATA out of the 12 measures; demonstrating a highly desirable (Peterson, 1994), inter-item reliability (Cronbach's alpha of .97) ; loaded on one factor with a very high Eigenvalue (6.07) [other competing loadings are diminutive] ; and high-explained variance (86.70%). The high Cronbach's alpha values for seven measures, namely FSTS, RDI,

FATA, FCETCE, AI, FETE, and FPTP demonstrate a proper selection of variables to construct the DOI index and practical reliability of the index, having a higher than the reliability of DOI index DOI_{INTS} developed by Sullivan (1994) offering a more modest alpha value of 0.79 (Sullivan, 1994, p. 333). The Cronbach's alpha values of the remaining five research variables, NNIE, TMIE, FMTM, ESTS, and PDIO are unacceptable (i.e., $\alpha < 0.7$), so these measures are dropped.

The next step of the study is examining the degree of correlation between these resulting seven measures intended to measure the DOI of Indian manufacturing companies. The correlation is calculated by the Pearson correlation coefficient *(r),* and all results are statistically significant when tested at the 0.05% of significance. Amongst the seven measures, the strongest correlation is found between FSTS and RDI (0.992), while a comparatively weak correlation is found between RDI and FPTP (0.688). The correlations between all pairs of internationalization measures indicate that they could be good enough to compose the DOI index of Indian manufacturing companies since they tend to measure the same phenomenon from different perspectives (Sullivan, 1994).

Thus, based on the results of the evaluation of the variables, it can be concluded that the resulting seven variables, namely FSTS, FATA, RDI, FCETCE, AI, FETE, and FPTP demonstrate proper selection measures for constructing the index of DOI of Indian manufacturing companies as their validity assessments are consistent with Sullivan (1994), and these measures would provide more realistic information regarding various forms of outward internationalization, for example, the extent of research and development intensity, exports, M&As, capital employed, foreign equity, etc.

It is also observed that out of the seven variables, two variables, namely FSTS and FATA are common to the DOI_{INTS} scale of Sullivan (1994), while three variables, namely OSTS, PDIO, and TMIE (which were in DOI_{INTS} scale index) got dropped. The possible reason for these three variables not emerging as significant in the current study could be that Sullivan's (1994) study was based on 74 American companies which are more evolved internationally, have a greater geographical spread, and are ahead of Indian companies as they started their internationalization journeys much earlier and so some of Sullivan's measures were more suitable for American companies than companies from an emerging economy like India.

Construction of the DOI Index for Indian Manufacturing Companies

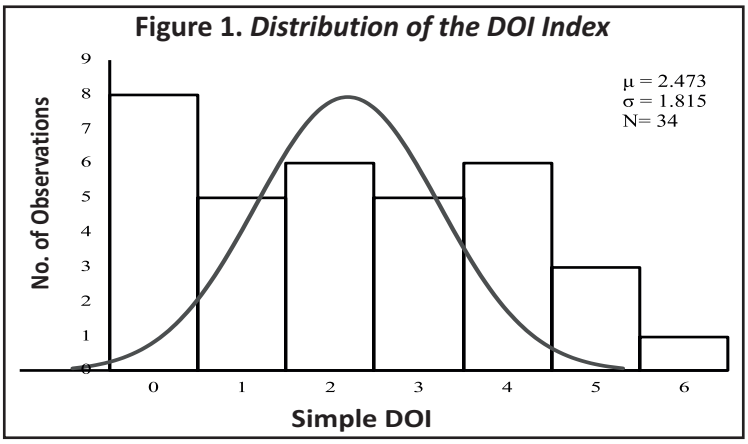
As the existing studies on internationalization of Indian companies have not attempted to develop an index to measure the DOI of Indian manufacturing companies, the current study follows Sullivan's (1994) method to construct the DOI index. Therefore, we verified inter-item correlation and performed reliability tests and factor analysis on the shortlisted variables to arrive at reliable measures to construct the DOI index. The final step is checking the normality of the distribution of the values of the 34 Indian manufacturing companies on the revealed scale of seven measures. This involved treating the variables FSTS, FATA, RDI, FCETCE, AI, FETE, and FPTP as a linear combination and adding them for each company as shown in the below operation to arrive at the DOI score of each firm. This score is termed as "Simple DOI."

$$Simple\ DOI = FSTS + FATA + FCETCE + FPTP + FETE + AI + RDI \quad .....(1)$$

The Simple DOI score for a company will range from 0 (absolutely no international involvement) to 7 (absolutely total international involvement). The plot of companies' value for Simple DOI suggests a normal distribution, as presented in Figure 1.

The 34 Indian manufacturing companies are then ranked and classified as high or low on their DOI based on their resulting score of Simple DOI scores as compared to the basic descriptive statistics (median value = 2.47,

Figure 1. ***Distribution of the DOI Index***



std. dev. = 1.8, range = 5.89). A company having a Simple DOI score greater than or equal to the median value of 2.47 is considered as "high" on DOI, and a company having a Simple DOI score less than or equal to the median value of 2.47 is regarded as "low" on DOI. The resulting classification has been presented in Table 5. It is observed that 17 companies are "high" on DOI, while 17 companies are "low" on DOI.

Finally, based on the Simple DOI measure, we arrive at a DOI index to assess where a company will stand vis-à-vis other companies in the sample based on its DOI ranking. This is done by taking the Simple DOI score on a scale of 100 for each company in the final sample. It can be seen from the results shown in Table 5 that the company D that has a Simple DOI of 6.13 has a DOI index of 88% and is ranked 1, while the company Q with a Simple DOI of 0.24 has a DOI index of 3% and is ranked 34. The empirical results of the DOI index indicate that the DOI of the observed 34 Indian manufacturing companies, as measured by a combination of seven measures,

Table 5. ***High/Low Classification, Ranking, and DOI Index Based on the Simple DOI***

Company Name (Masked) #	Simple DOI Score	DOI Index	Rank	High / Low Classification
D	6.13	88%	1	High
W	5.70	81%	2	High
V	5.38	77%	3	High
AC	5.00	71%	4	High
AF	4.98	71%	5	High
L	4.79	68%	6	High
F	4.76	68%	7	High
N	4.44	63%	8	High
M	4.12	59%	9	High
AE	4.10	59%	10	High
B	3.98	57%	11	High
S	3.76	54%	12	High
Z	3.66	52%	13	High
R	3.58	51%	14	High

J	3.14	45%	15	High
AD	2.96	42%	16	High
T	2.71	39%	17	High
A	2.23	32%	18	Low
O	2.21	32%	19	Low
X	2.05	29%	20	Low
AG	2.05	29%	21	Low
U	1.72	25%	22	Low
AI	1.65	24%	23	Low
Y	1.26	18%	24	Low
AB	1.03	15%	25	Low
AH	1.03	15%	26	Low
C	0.93	13%	27	Low
G	0.69	10%	28	Low
P	0.60	9%	29	Low
K	0.59	8%	30	Low
AA	0.37	5%	31	Low
I	0.32	5%	32	Low
E	0.30	4%	33	Low
Q	0.24	3%	34	Low

Note. # The list of 34 Indian manufacturing companies studied in the final sample is presented in the Appendix at the end of this study. However, the names of the companies in Table 5 are not revealed for confidentiality reasons.

namely FSTS, FATA, RDI, AI, FCETCE, FETE, and FPTP across 2012 – 2015, is high for 50% of the companies and low for 50% of the companies. Thus, the DOI index can indicate the DOI of the manufacturing companies in India appropriately.

The final step of the study is examining the degree of correlation between the seven measures and DOI to see which of the seven measures have the most influence on DOI. The correlation is calculated by the Pearson correlation coefficient *(r),* and all results are statistically significant when tested at the 0.05 level of significance. Amongst the seven measures, the strongest correlation is found between FSTS and DOI (0.992), followed by FATA (0.946), FCETCE (0.945), RDI (0.942), AI (0.928), FETE (0.912), and FPTP (0.824).

Thus, the empirical results of the study indicate that the seven measures, namely FSTS, FATA, RDI, FCETCE, AI, FETE, and FPTP meet the statistical standards and requirements for measuring the DOI of Indian manufacturing companies, as their validity assessments are consistent with Sullivan's (1994) DOI_{INTS} index. The study, therefore, successfully addresses the questions :

- Do measures exist to determine the variability of the DOI of Indian manufacturing companies ?
- Can the offered index be used to quantify DOI measures to determine the variability of the DOI within Indian manufacturing companies?

Implications

Theoretical Implications

The DOI of Indian manufacturing companies has not been studied adequately. One of the most common approaches applied in previous studies in the context of measuring the internationalization of Indian companies was by merely reporting the FSTS (Altaf & Shah, 2015), which is insufficient. The present study, however, has considered different forms of outward internationalization of Indian manufacturing companies, for example, the extent of research and development intensity, foreign capital employed, international acquisitions, etc., to get more realistic information regarding the different aspects of internationalization of Indian manufacturing companies. The DOI measures and the index proposed in the current study are one of the first attempts to operationalize the DOI of Indian manufacturing companies by capturing various forms of outward internationalization, and it would be a good opportunity for further literature development on Indian manufacturing companies. Thus, this study covers an unexplored area and builds on the previous literature pertaining to internationalization, having Indian multinational companies (MNCs) as exemplars.

Managerial Implications

The DOI index proposed in the present study is better suited to measure the degree of internationalization of Indian manufacturing companies and may have a more comprehensive application, as it is designed to cover various forms of outward internationalization, for example, the extent of research and development intensity, foreign sales, foreign capital invested, foreign assets held, and other relevant factors in the context of an emerging economy where studies are limited. Practitioners and academicians can leverage the insights gained from this study to successfully formulate internationalization strategies to achieve greater success in internationalization.

The DOI index can also contribute as a meaningful indicator of the gradation in the ranking and classification of various companies based on these seven measures. The implication of this study from a marketing management standpoint is that if the same analysis of data on these seven measures were to be done for another company from the manufacturing industry in India for the same three years or even for another standalone year, then one can know where that company stands relative to the companies in this research. These findings can be leveraged upon by decision-makers from other manufacturing companies that were not part of this study to determine whether they are likely to be high or low in terms of DOI relative to the companies in this research. This could be particularly useful for benchmarking purposes, as the overall results can facilitate them to make well-informed decisions in their internationalization journey.

Limitations of the Study and the Way Forward

The analysis of the current study is based on a final sample of 34 Indian manufacturing companies due to the availability of CEOs/CXOs and their willingness to share the data on account of confidentiality. A wider sampling of the Indian manufacturing companies may provide a deeper perspective on the DOI measurement of Indian manufacturing companies. It is likely that uncontrollable factors such as the role of government, the impact of free trade agreements, impact of economic upheavals, volatility in the commodity prices or foreign exchange rates, etc. which were not considered, may have had some impact on the companies involved in the study to varying degrees.

This study has focused on manufacturing companies in India. Further studies can be based on other emerging market economies such as BRICS countries and other parts of Asia on similar lines as a cross-country comparative study could be useful to validate the findings. Future research can include other sectors like – pharma, textiles, IT,

ITES, BPO, financial services, banking and consultancy services, which were excluded from the current study for reasons explained earlier.

Authors' Contribution

Ramakrishnan Ramamurthi conceived the idea and developed the research method in consultation with Dr. Rajan Saxena, Dr. Bala Krishnamoorthy, and Dr. Gordhan Saini to undertake the empirical study. He extracted research papers of high repute and generated concepts and models relevant to the research methodology. Dr. Saxena and Dr. Krishnamoorthy verified the analytical methods and supervised the study. Mr. Ramamurthi conducted the CEO/CXO interviews in person. He also performed the statistical analysis using SPSS 25.0, which Dr. Saini guided. Mr. Ramamurthi wrote the manuscript based on the advice and consultation with the other three authors who also made an immense contribution to the final research paper.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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Appendix

The names of Indian manufacturing companies included in the research are as follows :

1)	Apar Industries Ltd.
2)	Apollo Tyres
3)	Asian Paints Ltd.
4)	Bal Krishna Inds Ltd.
5)	Bharat Bijlee
6)	Bharat Forge
7)	Blue Star Ltd.
8)	Borosil Glass Works Ltd.
9)	Carborundum Universal Ltd.
10)	Century Plyboards India Ltd.
11)	Chemco (Company name is being kept confidential at the request of the respondent)
12)	Crompton Greaves Ltd.
13)	Godrej Consumer Products Ltd.
14)	Godrej Industries Ltd.
15)	Grasim Industries Limited
16)	Hero Motocorp
17)	J.K.Files India Ltd.
18)	Jain Irrigation Systems Ltd.
19)	JK Tyre & Industries Ltd.
20)	Mahindra & Mahindra Ltd.
21)	Metco (Company name is being kept confidential at the request of the respondent)
22)	Motherson Sumi
23)	Phillips Carbon Black Ltd.
24)	Pidilite Inds Ltd.
25)	Praj Industries Ltd.
26)	Royal Enfield-Eicher Motores
27)	Simplex Infrastructures Ltd.
28)	Suzlon Energy Ltd.
29)	Tata Chemicals Ltd.
30)	Tata Steel Ltd.
31)	Thermax Ltd.
32)	Tractor And Farm Equipment Ltd.
33)	Tube Investments of India Ltd.
34)	TVS Motor

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