IMPACT OF REVERSE INNOVATION ON GLOBAL COMPETITIVENESS OF MNCS: THE MODERATING ROLE OF UNDERSTANDING LATENT CUSTOMER NEEDS IN DEVELOPED MARKETS

Impacto da inovação reversa na competitividade global das MNCS: o papel moderador de compreender as necessidades latentes dos clientes em mercados desenvolvidos

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ABSTRACT

Reverse innovation (RI) is the adoption of an invention in an impoverished economy proceeding to wealthier countries. Reverse innovation has also become a brand-new growth strategy for Multinational Corporations (MNCs) to drive innovation in developing markets and further utilize the potential profit of certain developments by consequently presenting innovation not only in other market segments, but also in developed economies, providing MNCs with global sustained development. Reverse innovation studies may be conducted by extending previous ideas on innovation, internationalization, and MNC management. Thus, this study analyses the impact of Reverse Innovation on MNCs' global competitiveness. This study is unique because it attempts to study the moderating role of understanding latent customer needs in developed markets. Smart PLS was utilized to analyse the impact of Reverse Innovation. The database utilized in this analysis is primarily focused on the Siemens market with interviews and information provided by business customers because of their demonstrated success as well as high level of adoption in emerging economies. The PLS-SEM technique was chosen as the primary analysis tool because it is a variance-based technique. Their analysis found that performance in emerging markets requires end-to-end localization, core value discovery, and a balanced portfolio combination of both types of innovation.
Keywords: Developed Markets; Global Strategy; Reverse Innovation (RI); Multinational Corporation (MNC); Partial Least Squares (PLS)

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Impact of reverse innovation on global competitiveness of MNCS: the moderating role of understanding latent customer needs in developed markets

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RESUMO

A inovação reversa (RI) é a adoção de uma invenção em uma economia empobrecida que segue para países mais ricos. A inovação reversa também se tornou uma estratégia de crescimento totalmente nova para as Corporações Multinacionais (MNCs) para impulsionar a inovação nos mercados em desenvolvimento e utilizar ainda mais o lucro potencial de certos desenvolvimentos, apresentando, consequentemente, inovação não apenas em outros segmentos de mercado, mas também nas economias desenvolvidas, proporcionando Multinacionais com desenvolvimento global sustentado. Estudos de inovação reversa podem ser conduzidos ampliando ideias anteriores sobre inovação, internacionalização e gestão de multinacionais. Assim, este estudo analisa o impacto da Inovação Reversa na competitividade global das EMNs. Este estudo é único porque tenta estudar o papel moderador da compreensão das necessidades latentes dos clientes nos mercados desenvolvidos. O Smart PLS foi utilizado para analisar o impacto da Inovação Reversa. O banco de dados utilizado nesta análise concentra-se principalmente no mercado da Siemens, com entrevistas e informações fornecidas por clientes empresariais devido ao seu sucesso demonstrado, bem como ao alto nível de adoção nas economias emergentes. A técnica PLS-SEM foi escolhida como ferramenta de análise primária por ser uma técnica baseada em variância. A sua análise concluiu que o desempenho nos mercados emergentes requer localização ponta a ponta, descoberta de valor central e uma combinação equilibrada de portfólio de ambos os tipos de inovação.

Palavras-chave: Mercados Desenvolvidos; Estratégia Global; Inovação Reversa (RI); Corporação Multinacional (MNC); Mínimos Quadrados Parciais (PLS)

INTRODUCTION

In developed economies, Multi-National companies (MNCs) are challenged by market stagnation, financial variability, and bankruptcy. In addition, these MNCs are looking for sustainable growth and new market prospects, and have become interested in expanding the untapped consumer base in developing markets. However, the globalization strategy itself is unable to produce the desired outcomes. Companies must understand the unique requirements of the target market (be it developing or developed) to create successful entries that result in long-term success. It is recommended that MNCs employ a suitable strategy to grab their potential in these unusual markets by developing or creating goods that address market requirements. These innovations are accepted in developed and emerging economies because of the value they provide in terms of price and efficient quality (Zeschky, Winterhalter, & Gassmann, 2014). Sustainability concerns directly affect how businesses operate in the twenty-first century, because they enhance their competitive advantage. Because lowering pollution frequently coincides with productivity increases, sustainability can drive innovative methods, which will continue to be popular. According to this statement, organizations must have the organizational capability to establish unique green production practices through the creation of innovative organized schemes for environmental initiatives. These strategies' expenses must also be effectively managed to ensure long-term profitability (Malodia, Gupta & Jaiswal, 2020).

For a very long time, it was believed that only industrialized nations had the capability and ability to promote innovation. However, since MNEs engage heavily in research and development (R&D) at lower elevations to reap the benefits of closeness to the customer base and access to fresh talent, creativity is now primarily coming from rising nations such as China and India. Products are created and modified in response to regional requirements and realities, including economic limitations, regulatory regimes, and cultural variance. Developed nations have received these inventions or novel products (Petzold, Barbat, Pons, & Zins, 2019) . Radical innovation has been created in this way. Additionally, over the past 20 years, several technological concepts have been initiated in developing markets and are closely connected to reverse advancement. These concepts include cost-innovative ideas, resource-constrained innovations, jugaad inventions, Gandhian innovations, and frugal innovations. The majority of these ideas share a description that relates to creating new products and/or reworking existing ones from scratch at the lowest possible cost to address market demand. Numerous definitions exist for these ideas, most of which overlap according to recent and thorough literature reviews. Particularly for the notions of reverse innovation and frugal innovation, it is necessary to clarify the terminology and provide theoretical and concrete approaches (Senyard et al., 2014).

Being creative and pursuing new and distinct ideas is the only way to succeed and survive in a world that is quickly evolving, or where new technology and inventions can instantly overthrow established norms. The key problem facing businesses today is how to capitalize on innovations with ever-shorter life cycles while operating in a highly competitive environment, with many established players selling competing products. These continually emerging technical hubs, which attract a large number of individuals from all over the world, are also where the majority of inventions are produced. Innovation is acknowledged as a basic source of reasonable company improvement, and its capacity to produce improved results changes depending on a set of elements recognized as innovation capabilities (ICs), which are the results of the capacity to effectively explore the available assets to develop new ideas. Although several researchers contend that Ics has a positive impact on company productivity, it is unclear what exactly supports or contradicts this relationship. The concept of fit, which represents the correction of one or more variables when compared to another, can be used to study the link between two or more regions, functions, procedures, units, approaches, or capabilities. Satisfaction is considered to be highly impacted by a better match (Teixeira & Canciglieri, 2019).

For a very long time, it was believed that only industrialized nations had the ability and capability to promote innovation. However, since MNEs engage heavily in research and development (R&D) in low-income areas to reap the benefits of closeness to the targeted market, as well as the availability of fresh talent, creativity is now primarily coming from rising nations such as China and India. Products are created and modified in response to regional requirements and realities, including infrastructural limitations, industry regulations, and cultural variance. Developed nations receive inventions or novel products. The idea of reverse innovation was created in this manner.

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Reverse innovation refers to a phenomenon in which a breakthrough created for or used in emerging markets is embraced in established markets (RI) (Dudaklı et al., 2021). The emergence of emerging economies, such as China and India, and the "demolition "of the world appear to be shifting the location of development in the global economy. Poor, developing nations no longer merely copy developed nations' innovations; occasionally, they also share their innovations with the rest of the world, particularly developed nations. Reverse innovation is the term research used to define the situation in which an invention is initially embraced in an underprivileged country until it is accepted in rich countries. It is unclear whether reverse innovation will become more common in the future, but it now seems rare. Consequently, this article focuses on a developing phenomenon whose possibilities for the future are unknown.

Exporting SMEs must compete fiercely on a global scale in the context of the rapidly increasing automation and market conditions. Many Chinese SMEs must switch from competing largely based on the cheapest cost to developing new products that provide their overseas consumers with the best overall value as a result of rising prices. SMEs need to learn how to innovate to succeed in the long term. Researchers define innovation as the extent to which people in a social structure adopt something new very early compared to others (Islam et al., 2021). At the organizational level, researchers describe innovation as the abilities and expertise required for a business to successfully adopt, manage, and enhance both current and new technologies, products, and procedures. Many SMEs manage to establish innovative capabilities as a result of obstacles such as constrained monetary capacity, absence of internal technical competence, and availability of technological and market intelligence. SMEs in many companies are unable to perform internal R&D projects because of their limited resources and competencies. The legacy of centralized planning in China and the wide range of regional growth levels make it even more difficult for SMEs to innovate. As a result, most SME breakthroughs have traditionally been built on commercially available technology, concepts, and/or resources (Golgeci et al., 2019).

Despite these difficulties, none of the currently operating businesses are ready to quit and allow other competitors to take their customer base and expertise. To safeguard and preserve a company's competitive advantages and attempt to ensure ongoing and remarkable development, experimentation, training, and the formation of strong strategic partnerships have become increasingly potent tools. However, when technological innovation is disrupting and inventive, and more importantly, when it is developed by private enterprises, the defences that a company can use occasionally are insufficient to identify and accept it (Chandler, 1996). Today's leaders ought to and worry most about the possibility of being overrun by an unidentified or neglected danger, particularly if their business is defined by rapid technological advancement. For this reason, companies must keep a close eye on and meticulously supervise starting lines and arising realities to efficiently identify and respond to threats posed by novel and potentially disruptive technologies or marketing strategies, if they hope to continue to succeed and develop in the long term. A challenging situation frequently calls for a company to exert additional effort in acclimating its corporate strategy to the various challenges it faces and to enhance organizational flexibility to deal with the quick pace, which has always categorized most industries, particularly in recent years (Hukkelberg et al., 2019).

Modern customers have more authority over their purchasing decisions, are more adept at digesting information, and demand the best value, claiming that consumers are unpredictable, extremely diverse, constantly changing, blinkered, obstinate, and generally problematic. The bank needs to be aware of its current circumstances and break its poor habit of disregarding the needs of its clients to satisfy them with the caliber of its offerings. When this is ruled out, the bank is geared up to accept the worst-case scenario, in which its clients depart. Achieved customers are given the best service to increase their brand loyalty (Kassim et al.,2021). Customer loyalty is among the most important management strategies for preserving the market's competitive advantages and elevating brand quality. Additionally, they assert that marketing expenses should be minimized if a firm has a repeat consumer. Additionally, the cost of keeping current consumers is approximately six times less than that of acquiring new ones. The fact that regular customers spend significantly more in comparison to non-loyal customers and act as the brand's main advocates by spreading favourable word of mouth are two additional aspects that contribute to the enormous influence of brand loyalty. However, according to a prior study conducted between 2009 and 2019, there are no studies on the elements that influence brand loyalty in household cosmetics (Islam et al.,2021). Additionally, an investigation of the moderating impacts of customer demographics aids in the clarification of discrepancies

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between the results of earlier studies on the impact of antecedents on customer loyalty. Investigating the moderating effect of pertinent demographic factors in loyalty models, such as age, sex, profession, relationship status, wealth, and location of customer residency, is desirable to better understand how customer loyalty is formed. The limited research currently available on this topic concentrates primarily on the effects of such mediating variables on customer satisfaction while ignoring the linkages between loyalty and other precursors (Qayyum et al.,2013).

1 RELATED WORKS

The leverage of customer engagement in new product development (NPD) is a crucial decision as more B2B companies integrate customers into the process, as it could be a double-edged dagger with both positive and negative aspects. Research confirms prior research that implies business strategy positively affects NPD effectiveness using a sample of 193 B2B companies from a variety of industries. Next, researchers investigated how this connection can be strengthened or lessened depending on how consumers are used in the NPD process. According to the findings, having consumers participate in a wider range of NPD operations (customer involvement breadth) improves the connection between market orientation and NPD efficiency, whereas having customers participate at greater depths reduces it (customer participation depth). According to the research's conclusions, market-oriented businesses must carefully consider how deeply and broadly to incorporate clients into the NPD process. It helps market-oriented businesses ensure that the client imprint is present throughout all phases of the planning phase process, which is referred to as width. Even though depth can indeed be essential for the transfer of knowledge acquisition, businesses that entail consumers too deeply, especially when they are fully carrying out the various steps in the NPD process (as in the case of full innovation offshoring), run the risk of failing to develop the skills required for achieving high NPD (Morgan et al.,2019).

A growing number of businesses are using architecture as a tool to gain the upper hand in today's cutthroat business environment. This study investigates the link between customer and supplier participation in the development process and new performance metrics by utilizing the asset view (RBV) of the organization. By adding product innovation capabilities (evolutionary and revolutionary) as a moderator to define the initial conditions of the effect of customer/supplier participation in the development of a new product's performance, the investigation also expands the RBV to a contingency lens. Customer engagement in product design improves innovative performance under conditions of high incremental innovative behaviour, but degrades the performance of new products under conditions of low accumulative innovative behaviour, according to research utilizing information from Canadian high-tech businesses. On the other hand, highly incremental and revolutionary invention capabilities benefit from supplier development in designing. A discussion is held regarding the management ramifications of the design function concerning various innovation capacities. These findings provide important insights for practical applications. The findings show that to maximize the performance of new products, design engineers and new device executives must be conscious of how supplier and customer participation in conceptual design combines with gradual and radical innovativeness (Menguc et al., 2014).

Researchers analyse why intellectual capital improves venture creation growth (NVG) in this study and suggest it as a critical enabler of NVG. Reverse engineering, a fluid capacity, was used as a moderator in our investigation, and the positioning advantage was used as a significant coefficient of determination. The results show that decrypting buffers the contribution of human resources to NVG, using survey data gathered from 229 new production processes in an expanding economy (Ghana). Contingencies studies have also shown that source code has a higher beneficial effect on NVG at high levels of the low-cost approach. However, when the marketing strategy is strong, the correlation between reverse engineering and NVG decreases. The results and ramifications were examined. A high level of human capital is undoubtedly the most crucial resource for the success and expansion of an organization. Furthermore, current research indicates that source code, which depends on an organization's human capital, has a significant impact on how well emerging market companies operate. This assessment may have been affected by management bias because it relied on self-report. Consequently, it would be helpful to verify the current findings using objective evidence on NVG, including actual sales, customer base, and profitability (Adomako et al., 2022).

A crucial competitive advantage is effective inter-organizational new product development (NPD); however, many NPD initiatives still fail. Researchers analyze the productivity effects of information inputs across partnering companies, both in regard to the external assessment in relation to input density, to gain fresh perspectives on the phenomena. A total of 210 inter-organizational NPD studies are used to evaluate a set of theories that utilize primary and secondary information from many industries. These findings are consistent with the assumption that input saturation has a detrimental effect on visual appeal, which is significantly linked to product market efficiency. The post hoc review showed the connection to be an invertible U-shaped connection, even though researchers unexpectedly found a negative linear impact of the external assessment concerning quality and design. Researchers have also uncovered evidence to support the functions of technological interconnectedness in reducing the effects of the external input ratio and input concentration on effectiveness. This study presents management implications for choosing innovation collaborators to develop an information portfolio that best enhances NPD construction productivity by elucidating how information contributions influence project outcomes under various levels of technological interconnectedness. These findings demonstrate that information inflow parameters affect the effectiveness of product development processes. When choosing innovation collaborators to build a knowledge repertoire that suits unique project goals, NPD management may make better choices if they are aware of the advantageous properties associated with various information input qualities (Schmidt et al.,2022).

Even small and medium-sized businesses (SMEs) must develop their products and processes in today's fiercely competitive international market to beat their rivals and delight customers worldwide. Examining the success elements of innovativeness has become essential for SMEs' competitiveness and survival. In the context of small- and medium-sized emerging economies, this study investigates how the degree of internationalization (DoI) affects innovation capability through the mediating factors of the marketplace and entrepreneurship. With 235 SMEs in the United Arab Emirates (UAE), an expanding economy, researchers have evaluated the model and hypotheses. The results of partial least squares estimations show that the level of internationalization has a beneficial impact on innovation effectiveness. More significantly, this link is indirect and controlled by SMEs' market and entrepreneurship orientations. These findings clarify the mechanism by which DoI affects innovation efficiency in the context of SMEs operating in developing markets. This study examined an under-researched issue and provided a new model to demonstrate how internationalization and innovation are related to SMEs in emerging economies. Globally, the effectiveness of leadership benefits from internationalization. This study specifically indicates that this impact is mediated by MO and EO. Consequently, MO and EO are two fundamental foundations for achieving greater innovation capability in internationalized SMEs (Genc et al.,2019).

2 HYPOTHESES DEVELOPMENT

Hypotheses were created to understand the needs of business customers. The initial goal of the hypothesis development is to investigate the link between brand loyalty and customer needs. It was also designed to investigate the connection between customer loyalty and customer needs. To investigate the connections between cost, customer need, and loyalty, specific hypotheses have been developed. Another hypothesis was developed to test the relationship between customer needs and loyalty. Additionally, the model includes an endogenous variable for customer needs. Customer needs are influenced by other latent constructs, such as quality and pricing, which in turn affect customer loyalty. Some of the hypotheses are given below.

H1- Loyalty and Quality of customers have a big impact on customer needs
H2- Loyalty and quality of customers have an impact on pricing
H3- Loyalty of the customer has an impact on customer need
H4- Customer need influence the connection among quality and loyalty
H5- Customer need influence the connection among pricing and loyalty
H6- The connection between the constructs is categorically moderated by type of business

3 MATERIALS AND METHODS

The study used SMART PLS with the Siemens database to analyse the effect of reverse innovation on the global competitiveness of MNCs. Interviews with business customers were carried out as part of the study's attempt to study the moderating role of knowing latent customer requirements in developed markets. PLS-SEM was used as a conceptual approach to identify the interviews in the study using a database of interviews for reverse innovations. Reverse innovation is characterized by marketing innovation, which includes the product's quality, the company's social responsibility, its profitability, its management, and its leadership ability to comprehend the needs of customers by understanding their views on product quality, profit, management, leadership, and the company's social responsibility. Figure 1 illustrates the conceptual structure of this study.

Figure 1: Structure of the proposed study
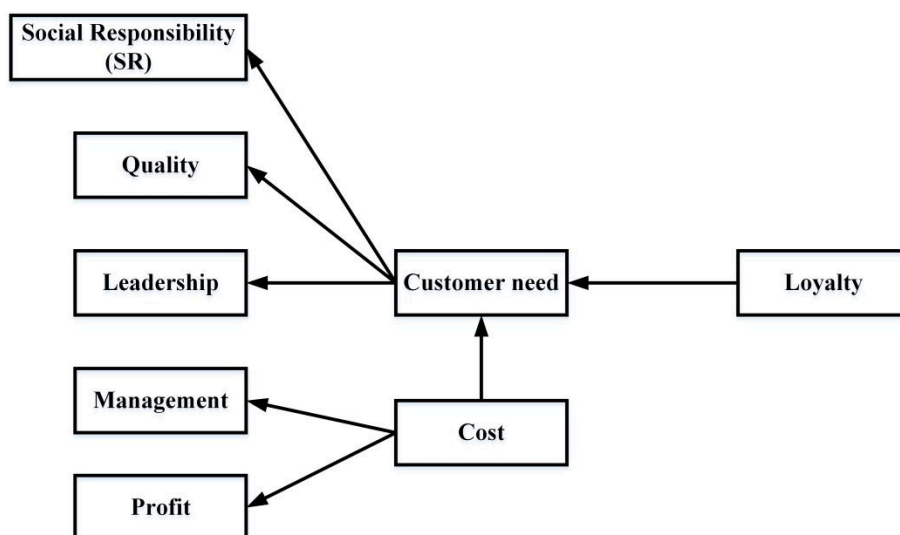
4 DATASET

With 73.5 billion euros in revenue in 2011, Siemens AG is a German multinational conglomerate company with headquarters in Munich and Berlin. Siemens AG's company has four divisions: Infrastructure & Cities, Healthcare, Energy, and industry. Every one of Each industry is further divided into several subsectors. For instance, the healthcare industry is divided into four subsectors: scanning and therapeutic processes, clinical products, prognostics, as well as service solutions. Siemens has been involved in market development for more than a century. Siemens' business sectors consistently focus on developing markets. In the last five years, there has been a significant increase in the rates of capital and human investment. A total of 150 questionnaires were submitted by Siemens, 52 of which were non-profit organizations (including governmental organizations), and the remainder were businesses that were for profit. Fortunately, there were no missing questions in the collected questionnaires.

4.1 Questionnaires

To understand customers' latent needs, this study utilized the following eight parameters: customer need, loyalty (Loy), cost (cost), quality (Qual), profit (Prof), management (Mang), leadership (Ldr), and Social Responsibility (SR).

Quality
Does the company offer dependable high-quality products with effective after-sales facilities?
Does the quality of the product meet the industrial standard?

Social Responsibility
Does the company continue to use production techniques that have a minimal negative environmental impact?
Does the company sponsor event and programs?

Cost
Does the product offered by this company have reasonable price?

Profit
Does this company perform better than the market standard in terms of share prices?
Are the production costs that this company offers acceptable?

Management
Do the workers and customers feel good about management?
Does this company have a comfortable cash position?

Leadership
Does this organization have a capable and effective leader for supervising everything?

Loyalty
Do you suggest this business to other customers?
Will you continue to choose this company to supply your goods?
Will you continue to be a customer in the future?

Customer needs
Are you happy with the goods and services this company has offered?
Are you satisfied with the product cost offered by the company?

5 ANALYSIS USING PLS-SEM MODEL ESTIMATION AND SPECIFICATION

In PLS-SEM, both structural and measurement models are specified. The measurement models depict the connections among each construct and its related metrics, whereas the structural model depicts the structural connections among the constructs. Both models are often represented graphically as paths that also show the variable relationships and hypotheses that need to be assessed for PLS-SEM analysis. Formally, the structural model is defined as follows in Eq.1:

$$\alpha = Y\alpha + \delta \qquad (1)$$

Here, α is the disturbance concept of the dependent latent variables, Y is the structure of path coefficients, and δ is a vertex among all latent constructs.

The specifications of the measurement models can be reflective or formative. The indicators are considered incomplete reflections of construct validity in a reflective measurement model [19]. The reflective model is specified in Eq.2:

$$C = Z\delta + \omega \qquad (2)$$

Here, Z is a structure of loadings referring to every indicator of latent constructs, and C is a vector of all metrics. ω is the disturbance definition of the metrics. A reflective measurement model has significant ties between the construct and its indicators once represented as a path model.

In comparison, a formative measurement model integrates the indicators to create the construct using Eq.3:

$$\alpha = XC + \beta \qquad (3)$$

Here β is the disturbance definition for the latent constructs, but it is set to zero in an attempt to make them formative.

This framework is similar to a weighted matrix of indicators, and X is the structure of weights from regressions of every latent construct on its affiliated indicators (Sarstedt et al., 2021). A formative and reflective

model relates a set of indicators directly to a particular construct. PLS-SEM can be structured as a hierarchical component model (HCM) that is reflective and formative but also contains both perceptible lower-order components (LOCs) as well as unobservable higher-order components (HOCs) to simplify the model and improve theoretical similarity. HOC has a reflective connection with these LOCs, and the quality, social responsibility, profitability, management, and leadership LOCs are all evaluated by reflective indicators that hang together well.

The PLS-SEM model specification was implemented in the smart PLS in two stages for algorithm estimation. The weight values for each measurement model were estimated in the first phase using a four-step method. The weights are the consequence of reversing a latent construct on its affiliated indicators or they correlate to zero-order correlations among a latent construct with each of its appointed indicators. The weights were utilized to calculate the latent construct scores as a linear function of their metrics after convergence. The structural and measurement parameters of the model are estimated in the second phase using the latent construct scores with path coefficient and load as inputs in a sequence of normal least squares regression analysis. Even if the modelling techniques are indicated reflectively or formatively, PLS-SEM adopts a composite-based strategy that uses normalized composites of metrics to portray the latent constructs in the predictive method (Sarstedt et al., 2021).

6 DISCUSSION

In PLS-SEM, the evaluation of a model involves a two-step process. Regardless of the type of measurement model, the first step examined the metrics and used various sets of measurements. Researchers must evaluate the construct and indicator reliabilities, convergent validity, and discriminant validity in the case of reflective measurement models. The convergent validity and indicator weights of formative measurement models must be evaluated. The structural model is examined in more detail in the second step, with an emphasis on the importance and applicability of path coefficients as well as the model's prediction efficiency.

Path estimation of Smart PLS

Based on the aforementioned conceptual framework, the PLS-SEM model in SmartPLS was developed for Reverse Innovation. The "repeated indicator method was used to direct the HOC. The indicator information is acquired using SmartPLS software once the prototype has been introduced. Before the path coefficients in the structural model can be accurately assessed, it must first be checked to see if the reflective measurement model's reliability coefficient, reliability of internal consistency, convergent validity, and discriminant validity are adequate. Figure 2 shows the structure of the import process.

Figure 2: Importing structure of indicator data
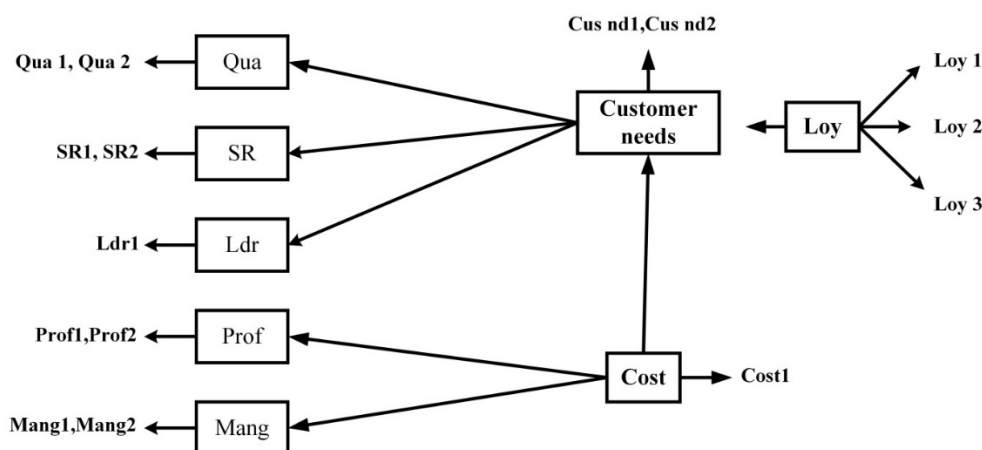
6.1 Indicator Variability

Since indicator reliability is a necessary condition for applicability, it is first determined whether the associated indicators share a significant number of similarities with the latent construct. The indicators that make

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up SR are eliminated after looking at the outer loadings, including every latent variable, because their outer loadings are below the 0.3 threshold level. Meanwhile, loadings of 0.3 to 0.6 are discovered for four indicators (quality, profit, management, and leadership). Therefore, to determine whether these four indicators should be retained in the model, a loading significance test was run on them.

6.2 Reliability of consistency

The four indicators (Quality, Profit, Management, and Leadership) were excluded from the PLS model because their removal would improve the Average Variance Extracted (AVE) as well as the consistent reliability of the corresponding latent construct. The internal consistency reliability of the assessment model was assessed using PLS with composite reliability. This is due to the fact that it considers the various outer loadings of the metrics. Increased amounts of internal consistency reliability are indicated by this study's composite reliability statistics for the constructs' Customer Need, Cost, and Loyalty, which are 0.8343, 0.6682, and 0.8269, respectively Table 1 shows the consistent reliability of the constructs.

Table 1 - Consistent reliability of constructs

Constructs	Consistent reliability	Average Variance Extract
Customer need	0.8343	0.4368
Cost	0.6682	0.4194
Loyalty	0.8269	0.5134

6.3 Validity of discriminant

A common and conservative method for evaluating discriminant validity is the Fornell-Larcker criterion, which can be used in PLS. The square root of the average variance extracted (AVE) of each latent variable must be higher than the correlations of the latent constructs to define discriminating validity. Since the square root of AVE for customer need, cost, quality, and loyalty is significantly greater than the appropriate constructs, Table 2 clearly demonstrates discriminant validity, which was compiled for this study.

Table 2 - Discriminant validity of constructs

Constructs	Loyalty	Cost	Customer need
Loyalty	0.6172	-	-
Cost	0.7881	0.6238	-
Customer need	0.4872	0.7145	0.6683

6.4 Determination of Coefficient

The estimation of the coefficient of variation is a crucial component of structural model assessment. The determination of loyalty was the primary construct of interest in this study. For example, the three constructs of loyalty, cost, and customer need may be able to collectively demonstrate 0.7 of the variability of endogenous construct loyalty, according to the PLS path parameter estimation given in Table 3. The R2 for the customer need construct is revealed through the same model estimation, which has been discovered to jointly accounts for 0.3 of the variation.

Table 3 - Determinant Coefficient (R^2) of constructs

| Constructs	Determinant coefficient
Loyalty	0.752
Cost	0.743
Customer need	0.790

6.5 Coefficient of Path

By examining the path coefficients and associated t-statistics for each construct in Smart PLS, it is possible to identify the connections among them. Table 4 shows that every structural model connection was also significant, supporting the various construct relationship hypotheses. It can be deduced from the PLS-SEM structural simulation model that customer needs have the greatest impact on loyalty, accompanied by costs and customer needs. Figure 3shows the construct's path coefficients. The PLS-SEM model estimation also demonstrates that low-order constructs–Quality, Profit, Management, and leadership–have strong connections with high-order constructs.

Table 4: Coefficient path of all constructs

Constructs	Original sample	Sample mean	Standard deviation(STDEV)	T statistiscs	P values
Cost→Customer need	0.322	0.373	0.212	1.517	0.132
Cost→Ldr	0.043	0.057	0.132	0.32	0.74
Cost→Mang	0.103	0.098	0.275	0.75	0.709
Cost→Prof	-0.329	-0.314	0.276	1.190	0.237
Cost→Qual	0.100	0.060	0.132	0.762	0.448
Cost→SR	0.196	0.088	0.224	0.874	0.384
Customer need→Ldr	0.133	0.144	0.276	0.482	0.631
Customer need→Qual	0.312	0.250	0.298	1.048	0.297
Customer need→SR	0.608	0.264	0.551	1.103	0.273

Loy →Customer need	-0.522	-0.433	0.433	.206	0.231
Loy →Ldr	-0.069	-0.003	0.179	0.387	0.700
Loy→Qual	-0.163	-0.163	0.224	0.727	0.469
Loy→SR	0.318	-0.155	0.384	0.828	0.410

Figure 3 - Path estimation coefficient
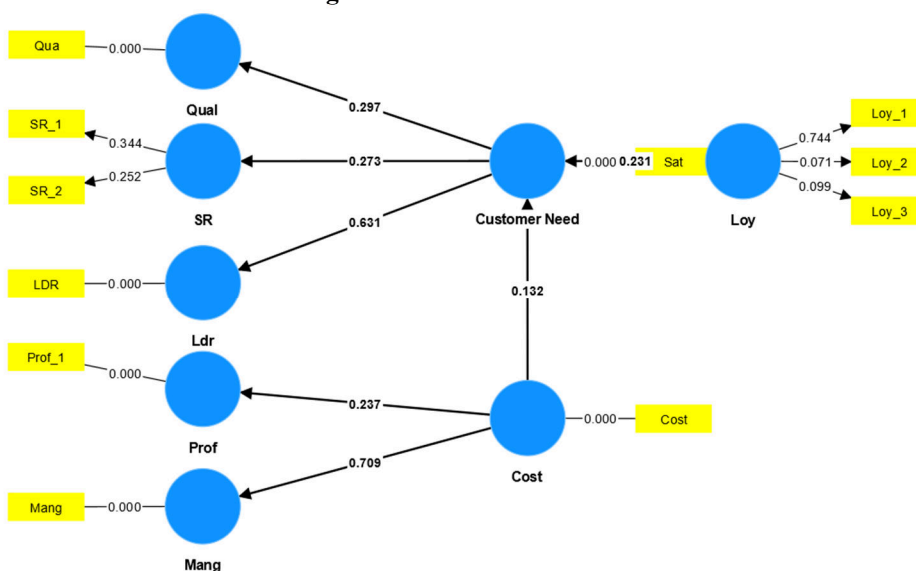
6.6 Consumer need in mediating mechanism

In Smart PLS, the connections between the constructs can be complicated and not always obvious. This study examines the possible moderating effect of customer need on the connections between quality as well as loyalty, and cost and loyalty to better comprehend the function of customer needs in the model. The following procedure, which uses bootstrapping in two steps, is used to achieve this goal: (i) the importance of direct impact is first assessed using bootstrapping without the inclusion of the mediating variable satisfaction in the model, and (ii) the importance of indirect consequence and affiliated t-values are assessed using path coefficients whenever the mediation process of customer need is present in the framework.

6.7 Hypotheses summary

Table 5 lists the outcomes of the research's acknowledged hypotheses, except for one of them. Both loyalty and customer need are discovered to be substantially impacted by quality, whereas cost also significantly affects these multiple endogenous variables. Additionally, it was discovered that customer need and loyalty continue to have a strong relationship. In the meantime, customer need plays a significant mediating role in the connection between cost and loyalty. The last hypothesis is disproved because there is no perceptible categorical mediating variable of specific industry in the prototype.

Table 5 - Summary of Hypotheses

		Accepted or not
H1	Loyalty and quality have a big impact on the customer need	Accepted
H2	Loyalty and customer needs have an impact on pricing	Accepted
H3	Loyalty of the customer has an impact on customer need	Accepted
H4	Customer need influence the connection among quality and loyalty	Not accepted
H5	Customer need influence the connection among pricing and loyalty	Accepted
H6	The connection between the constructs is categorically moderated by type of business	Not accepted

CONCLUSION

Reverse innovation (RI) is the adoption of a new invention that starts in an underdeveloped economy and moves to more developed nations. Reverse innovation has also developed into a cutting-edge growth strategy for multinational corporations (MNCs), enabling them to promote innovation in developing markets and further capitalize on the potential profit of certain developments by subsequently presenting the product/service to customers in both developing countries and developed economies, enabling MNCs to achieve sustained growth on a global scale. By extending the prior concepts of innovation, internationalization, and MNC management, reverse innovation studies may be conducted. This study examines how Reverse Innovation affects MNCs' ability to compete globally. This study is distinctive because it attempts to investigate the moderating function of recognizing latent consumer needs in developed markets. Smart PLS was used to analyse the effects of Reverse Innovation. Due to its proven success and widespread adoption in emerging economies, the database used in this analysis is primarily focused on the Siemens market and includes interviews and information provided by business customers. As PLS-SEM is a variance-based technique, it was selected as the main analysis tool for this study. According to the analysis, success in emerging markets requires complete localization, identification of core values, and a well-balanced portfolio of both innovation types.

Ethical Compliance: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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