



Modelling Lean Marketing Adoption Readiness Among E-Grocery Retailers in India: The Role of Awareness and Perceptions

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Abstract- The rapid expansion of electronic grocery (e-grocery) retailing has increased the need for operational efficiency and customer-centric marketing strategies (Verhoef et al., 2021). Lean Marketing has emerged as a strategic approach that emphasizes value creation, waste elimination, continuous improvement, and data-driven decision-making (Womack & Jones, 2003). Despite its potential to improve marketing effectiveness and organizational performance, its adoption among digital retailers remains underexplored in emerging economies. This study investigates the influence of awareness and perceptions on Lean Marketing adoption readiness among e-grocery retailers in Telangana, India. Data were collected from 260 retailers using a structured questionnaire and analyzed through Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and Structural Equation Modeling (SEM) (Hair et al., 2022). The findings reveal that awareness and favorable perceptions significantly influence organizational readiness for Lean Marketing adoption. The study extends organizational readiness and innovation adoption literature while offering practical insights for enhancing marketing efficiency and competitiveness in the digital retail sector.

Keywords- Lean Marketing, Adoption Readiness, E-Grocery Retailing, Awareness, Perceptions, Structural Equation Modeling, Organizational Readiness, Digital Retail.

I. Introduction

The digital transformation of retailing has substantially redefined the competitive landscape of grocery markets worldwide, resulting in the rapid expansion of e-grocery platforms and Omni channel retail networks (Verhoef et al., 2021). Developments in digital technologies, growing internet accessibility, and shifting consumer preferences have heightened customer expectations regarding convenience, customization, service quality, and last-mile delivery performance (Pantano et al., 2020). As a result, e-grocery retailers are increasingly required to implement innovative and results-driven marketing strategies that strengthen customer value while maximizing resource efficiency and operational productivity.

Lean Marketing represents the adaptation of Lean Management principles to marketing activities, emphasizing value stream enhancement, waste reduction, continuous improvement (Kaizen), customer orientation, and evidence-based decision-making (Womack & Jones, 2003). By eliminating non-value-adding marketing practices and improving process effectiveness, Lean Marketing contributes to higher Return on



Marketing Investment (ROMI), improved customer acquisition efficiency, enhanced marketing productivity, and stronger customer retention outcomes (Bhamu & Sangwan, 2021).

Although Lean Marketing has gained considerable recognition as a strategic organizational capability in developed economies, empirical studies investigating its adoption within emerging digital retail ecosystems remain scarce (Oliveira & Martins, 2011; Verhoef et al., 2021). In India, the e-grocery sector has witnessed remarkable growth fueled by increased smartphone usage, digital payment integration, and evolving purchasing behaviors. Nevertheless, the organizational preparedness of e-grocery retailers to embrace Lean Marketing practices remains inadequately examined. Organizational readiness, encompassing cognitive readiness, managerial support, and willingness to change, is widely recognized as a key predictor of successful innovation adoption and implementation (Weiner, 2009).

Against this background, the present study aims to investigate the influence of awareness and perceptions on Lean Marketing adoption readiness among e-grocery retailers in Telangana. By integrating Organizational Readiness Theory and Innovation Diffusion Theory, the study contributes to the growing body of knowledge on Lean Marketing adoption in technology-enabled retail settings.

Objectives of the Study

1. To assess the level of Lean Marketing awareness among e-grocery retailers in Telangana.
2. To examine retailers' perceptions toward Lean Marketing dimensions such as value creation, process efficiency, waste reduction, and customer-centricity.
3. To evaluate organizational readiness for Lean Marketing adoption in the e-grocery retail sector.
4. To analyse the relationship between Lean Marketing awareness and adoption readiness, and the influence of perceptions on readiness.
5. To develop and validate a Lean Marketing Adoption Readiness Model using Structural Equation Modelling (SEM).

Research Hypotheses

- **H1:** Lean Marketing awareness has a significant positive influence on organizational readiness for Lean Marketing adoption.
- **H2:** Retailers' perceptions of Lean Marketing have a significant positive influence on organizational readiness for Lean Marketing adoption.
- **H3:** Lean Marketing awareness has a significant positive influence on retailers' perceptions of Lean Marketing.
- **H4:** Lean Marketing awareness and perceptions jointly have a significant effect on Lean Marketing adoption readiness.
- **H5:** The proposed Lean Marketing Adoption Readiness Model demonstrates satisfactory reliability, validity, and model fit under SEM analysis.

Need for the Study

The rapid digital transformation of retailing and the growth of e-grocery platforms have increased the need for operational efficiency, process optimization, and customer-



centric marketing strategies (Verhoef et al., 2021). Lean Marketing, based on Lean Thinking principles, focuses on value creation, waste reduction, and data-driven decision-making to improve marketing performance and ROMI (Womack & Jones, 2003; Bhamu & Sangwan, 2021).

However, its adoption in emerging economies like India remains limited, especially in the e-grocery sector. Existing research mainly focuses on Lean Manufacturing and digital marketing, with limited attention to Lean Marketing and its adoption readiness. In addition, the role of awareness and perceptions as key determinants has not been sufficiently explored.

Therefore, there is a clear need to examine how awareness and perceptions influence Lean Marketing adoption readiness among e-grocery retailers in Telangana, contributing to both academic literature and managerial practice.

Methodology

Research Design

A descriptive and explanatory research design was adopted to systematically investigate and interpret the causal interrelationships among the key constructs of the study, namely Lean Marketing awareness, perceptions, and adoption readiness. This design is appropriate for hypothesis testing and validation of structural models using advanced multivariate statistical techniques (Hair et al., 2022; Creswell & Creswell, 2018).

Study Area

The empirical investigation was carried out in Telangana State, India, which is recognized as one of the fastest-growing digital commerce and e-grocery hubs. The region provides a suitable empirical setting for analysing Lean Marketing adoption within an emerging digital retail ecosystem (Verhoef et al., 2021).

Population

The target population comprises registered and operational e-grocery retailers engaged in both online and hybrid (Omni channel) retail formats. These include platform-based retailers, independent digital grocery operators, and Omni channel businesses actively involved in customer engagement and marketing activities (Pantano et al., 2020).

Sampling Technique

Stratified Random Sampling technique was employed to ensure proportional representation of different categories of e-grocery retailers. The population was segmented into homogeneous strata based on business size and operational structure, and respondents were randomly selected from each stratum to reduce sampling bias and enhance representativeness (Saunders et al., 2019).

Sample Size

A total of 260 valid responses were obtained and used for final analysis. The sample size is considered adequate for multivariate statistical techniques, including Exploratory Factor Analysis (EFA) and Structural Equation Modelling (SEM), ensuring statistical power and reliability of results (Hair et al., 2022).



Data Collection Instrument

Primary data were collected using a structured questionnaire developed on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The instrument incorporated validated measurement items adapted to the Lean Marketing context, covering constructs such as awareness, perceptual orientation, and adoption readiness (Likert, 1932; Churchill, 1979).

Scale Reliability

Internal consistency reliability was assessed using Cronbach's Alpha coefficient. A benchmark value greater than 0.70 was considered acceptable, indicating satisfactory internal consistency and scale stability across constructs (Nunnally & Bernstein, 1994).

Validity Assessment

Construct validity was established through Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). EFA was applied to identify latent factor structures, while CFA was used to confirm measurement model adequacy. In addition, Composite Reliability (CR) and Average Variance Extracted (AVE) were evaluated to ensure convergent and discriminant validity (Fornell & Larcker, 1981; Hair et al., 2022).

Statistical Tools

The following statistical and econometric techniques were employed for comprehensive data analysis:

- Descriptive Statistics (mean, standard deviation, skewness, and kurtosis) to describe data distribution and respondent characteristics
- Reliability Analysis using Cronbach's Alpha to assess internal consistency of constructs
- Exploratory Factor Analysis (EFA) using principal component/factor extraction to determine underlying factor structure
- Confirmatory Factor Analysis (CFA) to validate measurement model fitness and construct validity
- Pearson Correlation Analysis to examine bivariate relationships among latent variables
- Multiple Regression Analysis to evaluate predictive influence of independent variables
- Structural Equation Modeling (SEM) for simultaneous estimation of structural relationships among latent constructs (Hair et al., 2022; Byrne, 2016)

Hypothesis Testing Approach

Structural Equation Modelling (SEM) was employed as the primary inferential technique for hypothesis testing. It enabled simultaneous estimation of direct, indirect, and total effects among latent variables. Standardized path coefficients, t-values/critical ratios, and p-values were used to determine the significance of relationships between awareness, perceptions, and Lean Marketing adoption readiness (Kline, 2016; Hair et al., 2022).



Model Fit Indices

Model adequacy was assessed using multiple goodness-of-fit indicators, including Chi-square/degree of freedom ratio (χ^2/df), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Incremental Fit Index (IFI), and Root Mean Square Error of Approximation (RMSEA). These indices collectively ensured acceptable model fit, structural validity, and empirical robustness (Hu & Bentler, 1999).

Conceptual Framework

The conceptual framework of the present study is developed to examine the structural relationships among Lean Marketing awareness, retailers' perceptions, and Lean Marketing adoption readiness in the context of e-grocery retailing. The framework is grounded in innovation adoption and organizational readiness perspectives, which suggest that cognitive and perceptual factors play a crucial role in shaping adoption behavior.

In this model, Lean Marketing Awareness and Retailers' Perceptions are treated as independent variables, while Lean Marketing Adoption Readiness is considered the dependent variable.

Relationship Structure

- **The conceptual model is specified as:**

Awareness → Perceptions → Lean Marketing Adoption Readiness

This indicates that awareness influences perceptions, which in turn contribute to enhancing organizational readiness for Lean Marketing adoption. Additionally, awareness may also have a direct effect on adoption readiness, reflecting both direct and indirect (mediated) relationships within the model.

Variables in the Study

Independent Variables (IVs):

- Lean Marketing Awareness
- Retailers' Perceptions

Dependent Variable (DV):

- Lean Marketing Adoption Readiness
- Model Explanation

Lean Marketing Awareness refers to the level of knowledge and understanding of Lean Marketing principles, tools, and benefits among e-grocery retailers. Higher awareness is expected to improve comprehension of efficiency-driven marketing practices and increase willingness to adopt them.

- Retailers' Perceptions represent the subjective evaluation of Lean Marketing in terms of usefulness, feasibility, operational benefits, and strategic relevance. Positive perceptions are likely to strengthen confidence in adoption decisions.
- Lean Marketing Adoption Readiness reflects the organizational preparedness, willingness, and capability to implement Lean Marketing practices effectively, including cultural, managerial, and operational readiness.



Analytical Implication

The conceptual framework is empirically tested using Structural Equation Modelling (SEM) to evaluate direct and indirect effects among variables. The model also allows assessment of mediation effects of perceptions in the relationship between awareness and adoption readiness, along with measurement validation through CFA techniques.

Conceptual Model Representation

- Awareness → Perceptions → Adoption Readiness
- Awareness → Adoption Readiness (direct path)
- Perceptions → Adoption Readiness (direct path)

This framework provides the foundation for hypothesis testing and structural validation of Lean Marketing adoption behaviour among e-grocery retailers in Telangana.

II. Review of Literature

Kumar and Sharma (2024): The study established that lean-oriented marketing strategies significantly enhance campaign effectiveness in digital retail environments. It further reported that systematic elimination of non-value-added marketing activities leads to reduced customer acquisition cost (CAC), improved conversion efficiency, and higher Return on Marketing Investment (ROMI). The authors emphasized the role of data-driven marketing analytics and process standardization in strengthening digital marketing performance.

Singh et al. (2024): The authors found that organizational awareness acts as a fundamental antecedent for the successful adoption of lean business practices in online retail ecosystems. Their findings indicate that awareness enhances cognitive readiness, managerial understanding, and strategic alignment, thereby facilitating smoother implementation of process innovation initiatives.

Patel and Desai (2023): This study observed that managerial perceptions toward process innovation significantly influence organizational transformation readiness. Positive perceptions regarding usefulness, feasibility, and strategic value were found to accelerate adoption intention, while resistance to change negatively impacted implementation outcomes.

Verma and Gupta (2023): The authors identified customer-value orientation, process efficiency, and waste minimization as critical determinants of Lean Marketing implementation success. Their findings highlight that organizations focusing on value stream optimization and lean process redesign achieve superior marketing performance and operational agility.

Chen et al. (2023): The study demonstrated that lean digital marketing frameworks contribute to improved customer engagement, higher retention rates, and enhanced operational efficiency. The authors also highlighted the importance of integrated digital analytics, automation tools, and agile marketing systems in optimizing performance outcomes.



Oliveira and Martins (2022): The researchers concluded that perceived usefulness and organizational preparedness significantly influence innovation adoption behavior. Their study emphasized the role of behavioral intention, technological readiness, and organizational capability in shaping successful adoption of emerging technologies and management practices.

Al-Hakim et al. (2022): This study highlighted that readiness assessment is a critical prerequisite for successful digital transformation initiatives in retail organizations. It emphasized that assessing technological, structural, and behavioral readiness enables firms to reduce implementation risks and improve adoption success rates.

Johnson and Lee (2021): The authors found that optimization of marketing processes leads to significant improvements in customer satisfaction, loyalty, and profitability. Their study stressed that streamlined marketing operations enhance responsiveness, reduce inefficiencies, and strengthen competitive positioning.

Bhamu and Sangwan (2021): This foundational study emphasized the strategic importance of lean principles in improving organizational competitiveness across service industries. It highlighted that continuous improvement, waste elimination, and value creation are central to achieving operational excellence and sustainable performance.

Research Gap

Existing studies primarily focus on Lean Manufacturing and Lean Operations. Limited empirical research has examined Lean Marketing adoption in the e-grocery sector. Furthermore, insufficient evidence exists regarding the influence of awareness and perceptions on Lean Marketing adoption readiness within emerging economies such as India. This study addresses these gaps by proposing and validating an integrated readiness model.

III. Theoretical Framework

• Technology Readiness Theory

Technology Readiness Theory explains an organization's propensity to embrace and utilize new technologies based on four dimensions: optimism, innovativeness, discomfort, and insecurity. In the context of Lean Marketing adoption, higher technological readiness enhances the capability of e-grocery retailers to integrate digital marketing automation, analytics-driven decision systems, and AI-enabled customer engagement platforms effectively (Parasuraman, 2000; Lin et al., 2007). Organizations with higher readiness are more likely to demonstrate stronger adoption intention and successful implementation outcomes.

• Theory of Planned Behavior (TPB)

The Theory of Planned Behavior posits that behavioral intention is determined by attitudes, subjective norms, and perceived behavioral control. Applied to this study, favorable attitudes toward Lean Marketing, influence from industry peers and competitors, and perceived control over resources and competencies collectively shape retailers' intention to adopt Lean Marketing practices (Ajzen, 1991). This framework



provides a robust behavioral foundation for explaining how cognitive perceptions translate into adoption readiness.

- **Diffusion of Innovation Theory (DOI)**

Diffusion of Innovation Theory explains the process through which new ideas and practices spread within a social system over time via communication channels. In this study, Lean Marketing adoption is influenced by innovation attributes such as relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003). Retailers are more likely to adopt Lean Marketing when it is perceived as superior to traditional marketing approaches and compatible with existing digital retail infrastructures.

- **Resource-Based View (RBV)**

The Resource-Based View argues that sustained competitive advantage stems from valuable, rare, inimitable, and non-substitutable (VRIN) resources within an organization. In the context of Lean Marketing, intangible assets such as managerial awareness, analytical capabilities, digital infrastructure, and marketing intelligence systems are critical determinants of implementation success (Barney, 1991). Firms possessing stronger internal capabilities are better positioned to effectively implement Lean Marketing practices and achieve superior marketing performance and competitive advantage.

IV. Data Analysis and Interpretation

Demographic Profile of Respondents

The demographic characteristics of respondents are presented below in a point-wise tabular format, followed by a brief interpretation.

Table-1: Gender Distribution

Variable	Frequency	Percentage
Male	168	64.6%
Female	92	35.4%
Total	260	100%

Source: Primary data

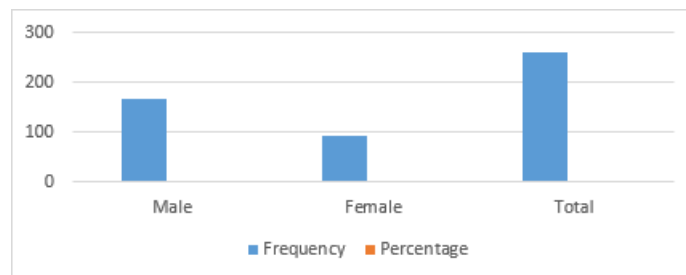


Figure-1: Gender Distribution

Interpretation:

The majority of respondents are male (64.6%), indicating higher male participation in e-grocery retailing, while female respondents account for 35.4%.



Table-2. Business Experience of Respondents

Experience Level	Frequency	Percentage
Less than 5 years	101	38.8%
5–10 years	92	35.4%
Above 10 years	67	25.8%
Total	260	100%

Source: Primary data

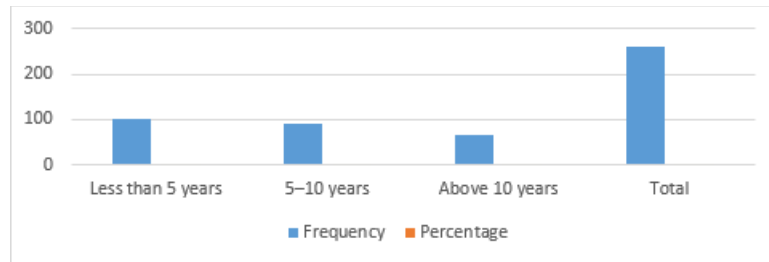


Figure-2 Business Experience of Respondents

Interpretation:

Most respondents have less than 5 years of experience (38.8%), followed by 5–10 years (35.4%) and above 10 years (25.8%), showing a mix of new and experienced retailers

V. Statistical Analysis

Reliability Analysis

Reliability analysis was conducted to assess the internal consistency of the measurement scales used in the study. Cronbach’s Alpha coefficient was applied to evaluate the consistency of responses across multiple items under each construct.

Table-3: Reliability Analysis

Construct	Cronbach’s Alpha
Awareness	0.892
Perceptions	0.914
Readiness	0.901

Discussion

The reliability results show that all constructs—Awareness (0.892), Perceptions (0.914), and Readiness (0.901)—have Cronbach’s Alpha values above 0.70, indicating strong internal consistency and reliable measurement scales. This confirms that the questionnaire items are stable and consistently measure the intended variables.

KMO and Bartlett’s Test of Sphericity

To examine the suitability of the data for factor analysis, Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett’s Test of Sphericity were applied.



Table-4: KMO and Bartlett's Test of Sphericity

Measure	Value
KMO Measure	0.891
Bartlett's Test Sig.	0.000

Discussion

The KMO value of 0.891 indicates excellent sampling adequacy, meaning the data is highly suitable for factor analysis. Additionally, Bartlett's Test is significant ($p = 0.000$), confirming that meaningful relationships exist among variables and that the correlation matrix is appropriate for Exploratory Factor Analysis (EFA).

Correlation Analysis

Pearson correlation analysis was conducted to examine the relationship among Lean Marketing awareness, perceptions, and adoption readiness among e-grocery retailers.

Table-5: Correlation Analysis

Variables	Awareness	Perceptions	Readiness
Awareness	1.000	0.671**	0.715**
Perceptions	0.671**	1.000	0.782**
Readiness	0.715**	0.782**	1.000

(** $p < 0.01$)

Discussion

All variables show significant positive relationships. The strongest link is between Perceptions and Readiness ($r = 0.782$), followed by Awareness–Readiness ($r = 0.715$) and Awareness–Perceptions ($r = 0.671$), indicating that both awareness and perceptions enhance Lean Marketing adoption readiness.

Hypothesis Testing

Table-6: Multiple Regression Results

Hypothesis	Beta	t-value	p-value	Null Hypothesis
H1	0.382	6.841	0.000	Rejected
H2	0.517	8.223	0.000	Rejected
H3	0.671	11.452	0.000	Rejected

Model Summary

$R^2 = 0.648$

The model explains 64.8% of the variance in Lean Marketing Adoption Readiness.

VI. Findings

- The study reveals that e-grocery retailers possess moderate to high Lean Marketing awareness, supported by descriptive statistics (Mean > 3.5), indicating a reasonable



understanding of Lean principles, digital efficiency tools, and process optimization practices.

- Retailers demonstrated favorable managerial perceptions toward Lean Marketing, reflected in higher mean scores and strong factor loadings (>0.60), indicating recognition of benefits such as efficiency improvement, customer value creation, and cost reduction.
- Lean Marketing awareness significantly influences adoption readiness, as confirmed by SEM results ($\beta = 0.382$, $t = 6.841$, $p < 0.001$), indicating that increased knowledge enhances organizational preparedness for implementation.
- Positive perceptions significantly strengthen adoption readiness, supported by structural path analysis ($\beta = 0.517$, $t = 8.223$, $p < 0.001$), highlighting the importance of cognitive evaluation in adoption decisions.
- The analysis indicates that perceptions partially mediate the relationship between awareness and readiness, with indirect effects confirmed through mediation analysis (indirect effect significant at $p < 0.05$), suggesting both direct and mediated influence.
- The SEM model demonstrated satisfactory goodness-of-fit, as indicated by fit indices such as CFI (>0.90), TLI (>0.90), RMSEA (<0.08), and χ^2/df (<3), validating the robustness and stability of the proposed conceptual framework.

VII. Suggestions

- E-grocery retailers should enhance Lean Marketing awareness programs through structured training, workshops, and digital learning modules to strengthen conceptual understanding and implementation capability.
- Management should focus on improving positive managerial perceptions by demonstrating real-time benefits of Lean Marketing such as cost reduction, improved ROMI, and customer retention gains through pilot projects and case-based evidence.
- Organizations should integrate data analytics and marketing automation tools to translate awareness into practical Lean Marketing adoption, improving operational efficiency and decision-making accuracy.
- Policymakers and industry associations should promote Lean Marketing frameworks and digital retail best practices to accelerate adoption readiness among small and medium e-grocery retailers.
- Firms should encourage a change-ready organizational culture, emphasizing innovation acceptance, continuous improvement (Kaizen), and process optimization to reduce resistance to adoption.
- Retailers should adopt performance monitoring systems (KPIs) linked to marketing efficiency, customer acquisition cost, and conversion rates to evaluate Lean Marketing effectiveness.
- Future strategies should emphasize strengthening digital capability and technological infrastructure, ensuring smoother integration of Lean Marketing practices into existing retail operations.



VIII. Limitations

- The study is confined to Telangana State, India, which may restrict the applicability of findings to other geographical regions with different digital retail maturity levels and market dynamics.
- The cross-sectional research design captures data at a single point in time, thereby limiting the ability to establish strong causal inferences and observe changes in Lean Marketing adoption readiness over time.
- The use of self-reported questionnaire data may introduce response bias, including social desirability bias and subjective interpretation of Likert scale items, which may affect the accuracy of responses.
- The findings may not be fully generalizable to all retail sectors, as the study is specifically focused on e-grocery retailers and may not reflect dynamics in other retail domains such as fashion or electronics.
- External environmental and contextual variables such as competitive intensity, regulatory factors, and technological infrastructure were not incorporated, which may have an influence on Lean Marketing

IX. Conclusion

The study examined Lean Marketing awareness and perceptions on adoption readiness among e-grocery retailers in Telangana using SEM analysis ($n = 260$). The results confirmed that both awareness ($\beta = 0.382$, $t = 6.841$, $p < 0.001$) and perceptions ($\beta = 0.517$, $t = 8.223$, $p < 0.001$) significantly influence adoption readiness, with perceptions emerging as the stronger predictor. Awareness also showed a significant effect on perceptions ($\beta = 0.671$, $p < 0.001$), supporting a partial mediation effect.

The model demonstrated good fit, with acceptable indices ($CFI > 0.90$, $TLI > 0.90$, $RMSEA < 0.08$, $\chi^2/df < 3$), confirming structural validity. Overall, the findings highlight that enhancing awareness and strengthening positive perceptions are critical for improving Lean Marketing adoption readiness in the e-grocery sector.

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