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Digital Technology Orientation and Digital Marketing Technology among Uttarakhand MSMEs: Mediating Role of Attitude and Moderating Role of Organizational Readiness

Hardev Singh¹, Dr. Mobin Anwar¹, Dr. Anjali Dimri²

¹PhD Scholar Uttaranchal Institute of Management Uttaranchal University
hardevsingh93@gmail.com

¹Assistant professor Uttaranchal Institute of Management Uttaranchal University
mobin.anwar@hotmail.com

²Assistant Professor Graphic Era School of Management (GESoM) Graphic Era
Deemed to be University, Dehradun (India)
Anjalidimri06@gmail.com

ABSTRACT: Adopting digital marketing technologies is essential to remain competitive, and MSMEs are no exception. Competitive and sustainable business development is the need of the hour. The present study examines the determinants of Digital Technology Orientation on the adoption of Digital Marketing Technology in MSMEs in Uttarakhand, India. The study also examines the mediating role of Attitude Toward Digital Marketing and the moderating role of Organizational Readiness in this relationship. Based on the Technology Acceptance Model and organizational readiness perspectives, a conceptual model was developed and empirically tested using data collected from 320 valid respondents. A cross-sectional statistical research design was adopted, and the data were analysed using PLS-SEM. The results indicate that digital technology orientation has a significantly positive impact on the attitude towards digital marketing and the adoption of digital marketing technology. Attitude Toward Digital Marketing also significantly affects the adoption of digital marketing technology and partially mediates the relationship between Digital Technology Orientation and adoption behaviour. What's more, organizational readiness largely arbitrates the relationship between digital technology orientation and attitude towards digital marketing. This result indicates that the process of enhancing the adoption of digital infrastructure, employee capabilities, and organizational resources requires managerial support. The study contributes to the digital transformation and MSME literature by integrating technological, attitudinal, and organizational dimensions in a single framework. The findings have practical implications for MSME owners, policymakers, and support institutions in promoting digital readiness, training, and the strategic adoption of digital marketing technologies in geographically challenging regions such as Uttarakhand.

1. INTRODUCTION

1.1 Digital Marketing

An informational and static website was introduced for the first time in the 1990s. In 2000, the search engine optimization (SEO) algorithm was developed [1]. Customer satisfaction, customer loyalty, and customer engagement form the foundation of digital marketing strategy. These aspects impact the organizational out-turn. [2]. Fragmentation is increasing in the digital marketing sector. The dissemination of research across different subareas impedes the accumulation of knowledge. The analysis

identified four forms of cultural expertise on the internet: collaborative systems, traditional market systems, co-creation systems, and presumption market systems [3]. The fourth industrial revolution developed tools & technology, and the whole scenario impacted every sphere of human activity, including the marketing industry. The drive of digital tools figures out the modern paradigm of digital marketing and the findings of the current digital technology and tools used by the organization for their professional works [4]. The ICT platform derived the potential benefits of various activities for online business. The internet expanded the business opportunity out of the global market and provided a new age customized strategy, and offered dynamic research & study [5]. Digital marketing has rapidly propelled the global market forward. It has enabled small businesses to expand their operations into markets they could not have reached physically [6]. 21st-century ICT has rapidly transformed the social, economic, and cultural landscape. For the global market, the internet, social media, mobile applications, and other digital automation and communication tools have evolved from mere conveniences into essential components of daily use. [7]. This study analyses the shifts in marketing methods within the digital era. It discusses traditional strategies alongside trends prevalent in the digital landscape—such as advanced, innovative frameworks like content marketing, personalization, and cross-platform integration—as well as challenges and feedback regarding issues like privacy, the upgrading of new technological features, and knowledge development. It emphasizes the necessity for companies to remain flexible in the digital age [8]. The MSME sector plays a crucial role in the economic growth of developing and developed countries. The study found that approximately 99% of MSMEs do not reach benchmark profit levels. The reason for this is that their business operations are small-scale, which makes it difficult for private sector banks to invest in MSMEs. But on the other hand, the central bank increased its costs in accordance with government policy. [9]. The study identified the digital marketing capabilities of the MSME sector and the size of the persona across different enterprises. Previous studies indicate that MSMEs have improved their digital marketing skills. They have enhanced their knowledge regarding critical thinking, online user interaction, and the implementation of digital technology within MSMEs. [10]. The current era of technology and development has transformed various aspects of human life. With the rise in the number of internet users and MSMEs finding new marketplaces to incorporate digital marketing into their strategies, various digital marketing platforms have become available, such as websites, SEO, social media, and web analytics [11]. An affordable and advanced digital technology business model has helped MSMEs in Uttarakhand implement the "Technology Acceptance Model" (TAM). Digital technology has accelerated growth models within MSME companies. [12].

1.2 MSMEs India & Uttarakhand

Micro, small, and medium-sized businesses form the foundation of the Indian economy's growth. In 2024, there are 40 million MSMEs in India, contributing approximately 30% to the country's Gross Domestic Product (GDP) and generating 110 million jobs. The study looked at MSMEs' involvement across the manufacturing, trade, and service sectors. The manufacturing segment, incorporating textile and food processing, labour accounted for about 31% of the MSME workforce, while the trade and services sectors generated 33% and 36%, respectively. This study also discussed the capacity of Indian MSMEs to adopt financial practices, government policies and regulations, and human capital development. [13]. Indian MSMEs are quite diverse in terms of size, the variety of products and services offered, and the technologies adopted by the companies. The growth of Indian MSMEs has influenced perspectives on technology and policy. Digital platforms have identified several aspects of MSME growth, such as the internet, online marketplaces and e-commerce, mobile communication and marketing, online payment systems, and computer-aided design. Social media has fostered technological adaptability and the success of MSMEs. [14] The MSME sector is considered an engine of global employment growth and plays a crucial role in GDP, exports, and imports. The previous work highlighted the challenges and barriers faced by Indian MSMEs. Previous work highlighted the challenges and obstacles faced by Indian MSMEs. A lack of new advanced technology, an unskilled workforce, and the operational policies adopted by companies have impacted Indian government schemes [15]. The Indian economy has witnessed significant growth following the implementation of the new MSME policy for technology-based businesses. Key features include lower investment requirements, ease of doing business, and an increase in both domestic and export output. Agro-based MSMEs contribute 80% to Indian industry. [16]. The study found that MSMEs in 10 Indian states and Union Territories have achieved the highest growth compared to the global economy. In India, 51% of MSMEs are in rural areas, while 49% are in urban centers. The MSME sector contributed a growth rate of 40–50% in exports and accounted for a 30% share of India's GDP. [17]. The MSME sector contributed approximately 8% to India's GDP. It reflects holistic growth driven by digitalization and the development of a new digital ecosystem. Digital transformation accelerated the emergence of new online traffic and established a tech-based start-up culture in India, with the compounded annual growth rate of Indian online consumers at 18%. The pillars of MSMEs digitalization were the "Digital India & Make in India" initiative [18]. Uttarakhand state has two regions,

Garhwal and Kumaon. A past MSME-related study conducted in the Garhwal region identified various problems in the MSME sector. These MSMEs faced challenges such as difficulties in securing finance, a shortage of skilled workers, limited access to technology, environmental issues, and limited interaction between MSME units and marketers. By analysing the need for concerted efforts from government policymakers, stakeholders, financial institutions, and industry associations, MSMEs can enhance their growth and boost the state's economy [19]. Uttarakhand is a hill state, and a large area of the state is covered with mountains. The study analysed the growth of MSMEs in Uttarakhand over the past 10 years, as well as their role in investment and employment generation. This study concluded that Uttarakhand is one of the best places for setting up small-scale industries and for human resource development. The Uttarakhand government has created three categories for the establishment of MSMEs based on geographical conditions: the first comprising entirely hilly areas, the second entirely plain areas, and the third semi-hilly areas [20]

2. LITERATURE REVIEW

The three most useful platforms in digital marketing include Social Media Marketing (SMM), web tools and Search Engine Optimization (SEO), and the study focused on analysing the effective use of the above platforms in increasing the sales of MSMEs & SME units. [21]. Financial technology changed the business practices across industries; the Fintech industry was impacted by digital marketing and financial technology, enabling the sustainability and growth of MSMEs [22]. The advancement of digitalization has opened numerous opportunities for MSMEs to improve business performance and sustainability by incorporating digital marketing techniques. This study examined the 'influencer analysis' method of digital marketing, which has played a crucial role in enhancing performance. [23].

2.1 Digital Marketing & MSMEs

Digital marketing can help organizations improve their capabilities, business performance and operational activities of SMEs in both rural and urban markets. Digital marketing also identifies a new role for small and medium-sized enterprises to transform their marketing processes and increase their return on investment [24]. Creativity in digital marketing is crucial for strengthening the marketing performance and business sustainability of MSMEs [25]. The results indicate that digital marketing strategies and information-sharing methods play a crucial role in enhancing the market presence of MSMEs, their engagement with customers, and the sustainability of collective marketing efforts [26].

2.2 Digital Technology Orientation

This study examined a specific theoretical framework and investigated the relationship between the Technology-Organization-Environment (TOE) model and the Technology Acceptance Model (TAM) in the context of the impact of digital strategy orientation and technology standards on the productivity of small and medium-sized enterprises. The results show a direct impact on digital strategic orientation and innovation. [27]. In the current era of Internationalization, competition between MSMEs is exceptionally tough. Technology orientation refers to the capacity and readiness of SMEs to adopt a technological mindset and to develop and improve products and services. The extent of technology orientation variables and entrepreneurial core competency can be analysed to determine the competitive benefits of MSMEs [28]. Digital Transformation 4.0 highlights the potential of digital technology and innovation for small businesses; it also encompasses financial learning for MSMEs, addressing the need for technology and innovation within the business sector [29]. Digital orientation is an important skill that needs to be acquired to expand MSMEs [30].

2.3 Perceived Utility and Ease of Use

Davis was the first to develop the 'Technology Acceptance Model.' He identified 'Perceived Usefulness' and 'Perceived Ease of Use' as two key factors and described the elements that influence a user's adoption of a technology model [31]. Perceived usefulness is the confidence that using a specific technology will increase performance. Whereas Perceived Ease of Use is defined as the level of ease of use of that technology. These two components are considered the main factors in shaping consumer attitudes towards technology adoption [32]. By influencing consumers' actual usage behaviour, these factors also impact the adoption or acceptance of existing technology. Over the past few decades, TAM has expanded its scope and transitioned from old technology to current technology [33]. The TOE framework aims to analyse the personal and organizational perspectives on technology adaptation within internal and external networks, with a focus on organizational resources and environment. The TOE framework comprises three attributes: technological, organizational, and environmental [34]. TAM-TOE insights collectively highlight its utility and ease of use, while administrative and environmental aspects tend

to be somewhat more prominent during the initial stage. The perceived value and ease of use of a product have emerged as the strongest indicators of its future usage and the intent to use it. Evidence from start-ups and MSMEs suggests that the perceived utility of a technological innovation is significantly influenced not only by the technology itself but also by the organization's readiness. Perceived usefulness emerges as the context-dependent construct correlated with internal organizational conditions. Firm capabilities, defined processes, and financial resources are some internal factors that enhance a firm's ability to recognize and realize the value of new technologies. On the other hand, limited skills, unclear procedures, or budget constraints may weaken the perception of usefulness even when technology provides privilege. Moreover, some organizational factors, such as leadership support, strategic alignment, and cultural orientation, shape how technology-based benefits are interpreted and integrated [35].

2.4 Attitude Towards Digital Marketing

Attitude defines the level of an aspect of a person's behavior, i.e., positive or negative. The research analyzed the attitude towards the start-up founders' positive/negative intention about the digital marketing adoption, the founders' skills and technical knowledge, and incitement towards digital technology could be identified as a factor affecting the digital marketing adoption [36]. The MSME manager's financial attitude affected their access to capital for operational activities. The study shows the influence of financial attitudes on MSME outcomes [37].

2.5 Organizational Readiness

The likelihood of MSMEs adopting technology increases when these systems align with their business models, strategies, and operational processes. A lack of alignment can slow down the adoption. Perceived compatibility plays a crucial role as businesses tend to embrace technologies that fit well with their current practices and needs. External support, such as technology vendors, government bodies, and educational institutions influences adoption through building awareness, providing necessary knowledge, and increasing confidence among small businesses. Additionally, pressure from trading partners and prevailing industry trends may encourage MSMEs to adopt e-commerce [38]. Rapid technological advancements and the rise of new business concepts are pushing individuals and organizations to become more adaptable. Moving from traditional ways of working to digital approaches is not a simple shift; it requires thoughtful preparation and adjustment. This transition depends on various factors, such as a person's openness to change, their level of digital knowledge and skills, the size and structure of the organization, and the broader business environment. Successful digital transformation is shaped not only by technology itself but also by human readiness and organizational context [39].

2.6 Adoption of Digital Marketing Technology

This study emphasized initiatives for Information and Communication Technology (ICT) capacity building and the development of scalable digital infrastructure, thereby enabling the adoption of advanced marketing tools. These tools are designed to integrate digital marketing technology and marketing capability frameworks, with the aim of enhancing MSME performance through data-driven marketing decisions. The ICT framework helps in adopting new digital marketing tools (such as AI-powered analytics, CRM tools, and social media automation tools) and understanding their impact on MSME productivity across all digital channels [40]. In developing countries, several factors are inconsistent and affect the adoption of digital marketing technology in MSMEs. Even though increasing the digital technology accessibility, these countries faced unreliable significant adoption restrictions beyond infrastructure availability [41]. This study examined the crucial role of adopting digital technology in enhancing business growth and competitiveness among MSMEs, focusing primarily on social media marketing, e-commerce platforms, and online payment systems [42]. The adverse effects on MSME performance are reduced by technology adoption; it strengthens the influence of strategic planning. The study contributed to the understanding of MSME growth and success by examining the integrated effects on innovation, strategic planning, and technology adoption [43]. The adoption of technology and the changes associated with it among SMEs in developing countries were analysed. It highlighted the need to identify the processes that facilitate or impede the integration of new technologies in these contexts, often constrained by specific socioeconomic and cultural factors [44]. The strength of MSMEs in business lies in their sustainability, particularly in branding and technological know-how. MSMEs are not ready to adopt e-marketplaces due to limited sales and financial access [45]. SMEs are addressing rigid competition from multinational companies. SME owners need to improve their firm's bottom line. Even if they have limited funds, they need to improve their operational efficiency in terms of profitability. Adopting technology not only improves the overall performance of SMEs but also enables them to keep pace with multinational

companies. This study discusses online resources such as social media marketing, e-commerce, and Technology 4.0, through which small and medium-sized businesses can gauge their marketing capabilities [46]. This study discusses the reasons behind the adoption of e-marketing by MSME owners and managers. It covers aspects such as its contribution to and impact on business success, implementation, barriers encountered, prospects, costs, and information regarding government e-marketing initiatives [47]. This study attempts to identify the determinants of digital technology adoption by micro, small, and medium-sized enterprises (MSMEs) in a developing country economy. The study aims at examining the effect of environmental fit, task-technology fit, and viability on digital technology adoption intention by MSMEs using the fit-viability and task-technology fit theories. [48]. The study examined the impact of adopting digital technology on value creation and SME outcomes. In an era of intense global competition, business sustainability is essential. This can be achieved by adopting digital technology and bringing about revolutionary changes in the business sector, thereby offering SMEs unique opportunities to enhance sustainability and value creation. Specifically, it analyzes how social media platforms, big data analytics tools, IoT applications, blockchain technology, and AI-based applications impact economic and social value within SMEs [49].

3. RESEARCH GAP, OBJECTIVE, CONCEPTUAL FRAMEWORK, AND HYPOTHESIS DEVELOPMENT

3.1 Research gap and objective

The use of digital marketing technologies has attracted significant attention in recent years due to rapid digital transformation and technological developments within organizations. However, the existing literature has mainly focused on general technology adoption, e-commerce systems, artificial intelligence adoption, and social media usage, with few studies on the adoption of digital marketing technologies from an integrated organizational perspective [50]. Furthermore, previous studies have focused on Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) as two separate constructs in the Technology Acceptance Model (TAM), and comparatively less attention has been paid towards conceptualizing them as higher-order constructs such as Digital Technology Orientation (DTO) [51]. In addition, the current literature on digital transformation demonstrates the fragmented nature of technology adoption research and the lack of integrated frameworks that combine technological, attitudinal, and organizational dimensions [52]. Moreover, organizational readiness is considered a key factor in determining the success of digital transformation. But, recent research indicates that its role has mostly been studied as a direct predictor or mediator. There is very little empirical data regarding the impact of adoption-related attitudes on outcomes in the context of digital marketing [53]. Other studies also point to the need to explore organizational readiness in terms of digital orientation, employee capacity, infrastructure readiness, and digital culture in emerging technology environments. [54] Additionally, the mediating role of Attitude Toward Digital Marketing (ATDM) in explaining the influence of Digital Technology Orientation on the Adoption of Digital Marketing Technology (ADMT) has been overlooked in the extant literature. Recent studies on technology adoption suggest that affective and attitudinal mechanisms are underexplored, despite their significant impact on digital technology use behavior and organizational adoption decisions. [55]. Thus, the research article attempts to bridge these gaps by designing and pragmatically testing an integrated model to investigate the impact of Digital Technology Orientation on the adoption of Digital Marketing Technology, with Attitude Toward Digital Marketing as a mediating variable and Organizational Readiness as a moderating variable. This research advances the current digital transformation literature by combining technological, attitudinal, and organizational dimensions into a single conceptual framework.

3.2 Conceptual Framework

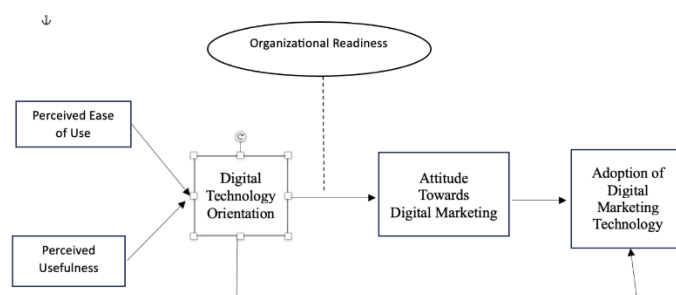


Fig 1: Digital Marketing Adoption Conceptual Model

3.3 Hypothesis development

Digital Technology Orientation (DTO) is an organizational propensity to adopt and use digital technologies to improve business performance. According to the Technology Acceptance Model (TAM), perceived usefulness and perceived ease of use are significant determinants of attitudes to technology adoption [56]. The greater an organization's digital orientation, the more positive its attitude towards digital marketing. Moreover, recent studies have also reported that technological capabilities and digital readiness positively influence the acceptance of digital technologies and transformation initiatives [57][58][59].

H₁: Digital Technology Orientation (DTO) has a significant positive effect on Attitude Toward Digital Marketing (ATDM).

Attitude Toward Digital Marketing (ATDM) is the organization's positive or negative assessment of digital marketing technologies. The theory of Planned Behavior suggests that attitude has a significant effect on behavioral intention and adoption behavior [60]. Earlier studies have shown that a positive attitude towards technology improves adoption intention and technology utilization [51] [58]. Similar findings were reported by Sharabati et al. (2024), who found that positive perceptions of digital marketing technologies can lead to higher adoption rates and better organizational results.

H₂: Attitude Toward Digital Marketing (ATDM) has a significant positive effect on Adoption of Digital Marketing Technology (ADMT).

It is likely that organizations placing greater emphasis on digital technology will understand its strategic importance and integrate it into their operations. The Technology Acceptance Model suggests that positive perceptions of technology influence adoption behavior. Technological orientation has also been recognized in recent studies to contribute to digital transformation and technology adoption [57][61] [59].

H₃: Digital Technology Orientation (DTO) has a significant positive effect on the adoption of Digital Marketing Technology (ADMT).

The Technology Acceptance Model (TAM) argues that attitudes are an important mechanism through which perceptions of technology influence behavioral outcomes [56]. Positive attitudes have been found to mediate the relationship between technological capabilities and technology adoption behavior in previous studies [51]. Positive attitudes towards digital technologies may explain the effect of Digital Technology Orientation on technology adoption in the context of digital marketing [57][59].

H₄: Attitude Toward Digital Marketing (ATDM) significantly mediates the relationship between Digital Technology Orientation (DTO) and Adoption of Digital Marketing Technology (ADMT).

Organizational Readiness (OR) refers to the existence of managerial support, organizational resources, and technological infrastructure required for technology implementation. Organizational factors are important in technology adoption decisions, as the TOE framework suggests [62]. It is known that organizational readiness plays a significant role in enabling digital transformation and technology adoption [53][55][57].

H₅: Organizational Readiness (OR) significantly moderates the relationship between Digital Technology Orientation (DTO) and Attitude Toward Digital Marketing (ATDM)

4. RESEARCH METHODOLOGY

Research methodology represents the systematic framework adopted for conducting scientific investigation to achieve the objectives of the study and test the proposed hypotheses. It describes the overall design of the collection of data, measurement, analysis, and interpretation of results. The current goal is to investigate the impact of Digital Technology Orientation (DTO) on the adoption of Digital Marketing Technology (ADMT) with Attitude Toward Digital Marketing (ATDM) as a mediator variable and Organizational Readiness (OR) as a moderating variable.

4.1 Layout of Research

Planning to design a research framework for the systematic and scientific conduct of a study. The learning employed an expressive and explanatory research layout. The descriptive nature helped in understanding the characteristics and perceptions of the respondents towards the adoption of digital marketing technology. The causal relationship between the variables is having an explanatory research design.

Quantitative research approach was adopted for the study. This is because quantitative methods enable objective measurement of variables and statistical testing of hypotheses. The structured questionnaire was used to collect data.

The current investigation is a cross-sectional analysis in which data were collected from participants at a single point in time.

For study findings to be reliable and broadly applicable, population size is a crucial factor. Of the 400 questionnaires sent to respondents, 320 valid responses were obtained and used in the final analysis.

A non-probability convenience sampling method was employed in this investigation. Due to respondents' availability, time constraints, and familiarity with digital marketing technology, convenience sampling was employed.

4.2 Sample Size

Sample size is an important consideration for the reliability and generalizability of research findings. The total 400 questionnaires were distributed, out of which 320 valid responses were received and used for final analysis [63]. Suggest a minimum sample size of 10 times the number of questionnaire items (10×29 items = 290 responses). Parameter estimation is improved, and indices of fit are better for larger samples (>200) [64].

According to Hair Partial Least Squares Structural Equation Modelling (PLS-SEM) requires a significant sample size for effective estimation and hypothesis testing; hence, the sample size was deemed adequate. The sample size also meets the "10-times rule" commonly applied in PLS-SEM analysis [65].

4.3 Research Instruments

A research instrument is a systematic tool or method used to collect, measure, and analyze data in accordance with the specific objectives of a research study [66]. It is the most common method for collecting data from participants, subjects, or secondary data sources. Research instruments may include surveys, interviews, questionnaires, observation checklists, or experimental protocols, depending on the study and its data needs [67]. The survey was the main research instrument used in this study. The Structural Equation Model using the Partial Least Squares approach was used to analyze the data. The analysis was thorough and methodologically sound, as the methodology was applied to test the proposed hypotheses and validate the measurement model

Independent Variable

Digital Technology Orientation (DTO)

Digital Technology Orientation (DTO) was conceptualized as a higher-order construct comprising two dimensions: perceived usefulness (PU) and perceived ease of use (PEOU). The construct was measured with 13 items adapted from [56]. Participants used a 5-point Likert scale, with 1 denoting "strongly disagree" and 5 representing "strongly agree," to rate their responses.

Perceived Ease of Use (PEOU) was measured with seven items adapted from [56]. The scale reflected respondents' perceptions of how easy it was to learn, understand and use digital marketing technologies.

The Perceived Usefulness (PU) was measured using six items adapted from [56]. The scale measured the extent to which respondents believed that digital marketing technologies improve performance, productivity, and effectiveness.

Dependent variables

Adoption of Digital Marketing Technology (ADMT)

Adoption of Digital Marketing Technology (ADMT) was measured using five items adapted from [60]. The scale captured respondents' intentions, willingness, and continued use of digital marketing technologies. On a five-point Likert scale, with 1 indicating "strongly disagree" and 5 "strongly agree," respondents were prompted to rate the items.

Mediator

Attitude Toward Digital Marketing (ATDM)

Attitude towards Digital Marketing. Attitude towards digital marketing was measured with five items adapted from [56]. The scale measured the positive/negative feelings, perceptions and evaluations of the respondents towards the use of digital

marketing technologies. The participants were asked to rate the items on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).

Moderator

Organizational Readiness (OR)

Organizational Readiness (OR) was measured using six items adapted from [62] and [55]. The construct measured the organization's readiness in terms of technological infrastructure, managerial support, employee capabilities, and organizational resources for adopting digital marketing technologies. A five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), was used to evaluate each item.

Research Tools

SmartPLS has gained widespread popularity and influence as a tool for structural equation modeling (SEM), particularly for research with an exploratory and predictive focus. SmartPLS uses a variance-based approach. Unlike traditional covariance-based SEM tools, partial least squares (PLS) is very effective for complex models with multiple latent constructs, even with small sample sizes or non-normal data distributions [68]. This flexibility is particularly suited to research in areas such as business, social sciences, and technology, where data often deviates from standard theoretical assumptions.

Additionally, SmartPLS provides an intuitive interface, advanced visualization options, and features like bootstrapping and blindfolding to improve model quality assessment and predictive relevance [69].

5. DATA ANALYSIS

The profile of respondents in MSMEs in Uttarakhand, India, based on a total sample of 320 individuals, provides significant insights into workforce composition and demographics.

Structural Equation Modelling (SEM)

PLS-SEM, or partial least squares structural equation modeling, has been used to effectively assess the study's aims and confirm the related hypotheses.).

Measurement model

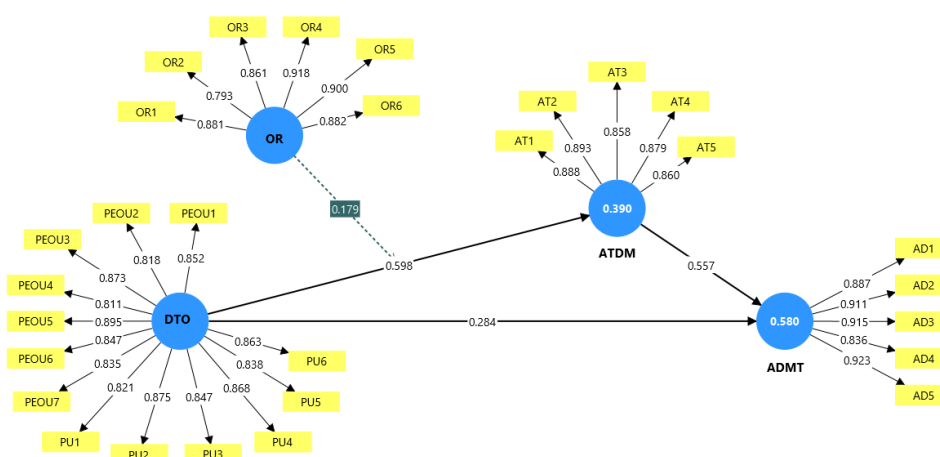


Figure 2: Measure model (Outer Loading)

Table 1: Outer Loading values

	ADMT	ATDM	DTO	OR	OR x DTO
AD1	0.887				
AD2	0.911				

AD3	0.915				
AD4	0.836				
AD5	0.923				
AT1		0.888			
AT2		0.893			
AT3		0.858			
AT4		0.879			
AT5		0.860			
OR1				0.881	
OR2				0.793	
OR3				0.861	
OR4				0.918	
OR5				0.900	
OR6				0.882	
PEOU1			0.852		
PEOU2			0.818		
PEOU3			0.873		
PEOU4			0.811		
PEOU5			0.895		
PEOU6			0.847		
PEOU7			0.835		
PU1			0.821		
PU2			0.875		
PU3			0.847		
PU4			0.868		
PU5			0.838		
PU6			0.863		
ADMT: Adoption of Digital Marketing Technology, ATDM: Attitude Towards Digital Marketing, DTO: Digital Technology Orientation, OR: Organization Readiness,					

The measuring model's reliability and convergent validity were assessed by examining the indicators' outer loadings. [70] recommend loading indicators above 0.70 to ensure that observed variables align with latent constructs. All indicators exceed the recommended threshold of 0.70, according to the outer loading data. validating their dependability.

The adoption of Digital Marketing Technology (ADMT) indicator loadings ranged from 0.836 to 0.923. AD1, AD2, AD3, AD4, and AD5 had substantial loadings on the construct, indicating that the indicators accurately measure digital marketing technology adoption.

The ATDM construct has significant indicator loadings of 0.858.

Digital Technology Orientation (DTO) had good outside loadings and was represented by PEOU and PU. PEOU indicators had 0.811–0.895 loading levels. The loading values for the PU indicators ranged from 0.821 to 0.875. Both measures significantly contribute to Digital Technology Orientation and have good convergent validity.

Organizational Readiness (OR) indicator loadings ranged from 0.793 to 0.918. All indicators exceeded the minimal acceptable threshold, showing that the construct is measured accurately. OR2 had a lower loading value (0.793) but was still above the threshold; it was kept in the model.

Overall, the outer-loading results suggest that all indicators are reliable and represent their respective constructions well. Thus, the measurement model has good indicator reliability and acceptable convergent validity for structural model evaluation.

Construct Reliability and Validity

Cronbach's alpha, Composite Reliability (ρ_a and ρ_c), and Average Variance Extracted (AVE) were used to evaluate the accuracy and dependability of the constructs in this study

Table 2: Construct Reliability & Validity

	Cronbach's alpha	Composite reliability (ρ_a)	Composite reliability (ρ_c)	Average variance extracted (AVE)
ADMT	0.938	0.944	0.953	0.801
ATDM	0.924	0.927	0.943	0.767
DTO	0.968	0.969	0.971	0.722
OR	0.938	0.951	0.951	0.763

The reliability and convergent validity of the constructs were measured using Cronbach's Alpha, Composite Reliability (ρ_a and ρ_c) and Average Variance Extracted (AVE). Acceptable internal consistency reliability is shown by Cronbach's Alpha and Composite Reliability values greater than 0.70. The AVE values above 0.50 indicate acceptable convergent validity [71].

The results indicated that all constructs obtained good reliability and convergent validity. The range is 0.924 to 0.968, indicating a high level of internal consistency for the indicators, as indicated by Cronbach's Alpha values. For example, the value of Cronbach's Alpha of Adoption of Digital Marketing Technology (ADMT) was 0.938, Attitude Toward Digital Marketing (ATDM) was 0.924, Digital Technology Orientation (DTO) was 0.968, and Organizational Readiness (OR) was 0.938. All these values were significantly greater than the recommended threshold value (0.70), confirming the strong reliability of the measurement scales.

Likewise, the Composite Reliability values (ρ_a and ρ_c) for all constructs were also above the acceptable level. The ρ_c values ranged from 0.943 to 0.971, which means that the indicators consistently represent their respective constructs. The stability and constancy of the model is also affirmed by the composite reliability.

The Average Variance Extracted (AVE) values of all constructs were higher than the recommended threshold value of 0.50, thus establishing satisfactory convergent validity. AVE values were 0.801 for ADMT, 0.767 for ATDM, 0.722 for DTO, and 0.763 for OR. These outcomes demonstrate that each construct accounted for a substantial amount of variance in the indicators.

The results support strong internal consistency, reliability, and satisfactory convergent validity for all constructs. Thus, the measurement model can be considered reliable and suitable for subsequent structural model analysis.

Discriminant Validity

Table 3: Heterotrait-Monotrait ratio (HTMT)

	ADMT	ATDM	DTO	OR	OR $\times$ DTO
ADMT					
ATDM	0.774				
DTO	0.643	0.627			
OR	0.123	0.145	0.314		
OR $\times$ DTO	0.160	0.236	0.105	0.055	

According to [71], values of HTMT below 0.90 indicate sufficient discriminant validity; values below 0.085 are a more conservative criterion. The HTMT analysis showed that all constructs were below the recommended threshold of 0.90. It confirms the adequate discriminant validity among the constructs.[69]

The HTMT value between Adoption of Digital Marketing Technology (ADMT) and Attitude Toward Digital Marketing (ATDM) was 0.774, indicating a relatively strong relationship between the constructs, but still within the acceptable threshold. Similarly, the HTMT value between ADMT and Digital Technology Orientation (DTO) was 0.643, which also met the endorsed benchmark for discriminant validity.

The HTMT values for ATDM and DTO were 0.627, indicating that the constructs are conceptually related but empirically distinct. Moreover, the HTMT values for Organizational Readiness (OR) were relatively low, ranging from 0.123 to 0.314, further strengthening the discriminant validity among the constructs.

The interaction construct $OR \times DTO$, which was added to test the moderating effect of Organizational Readiness on the relationship between Digital Technology Orientation and Attitude Toward Digital Marketing, also showed acceptable HTMT values. The HTMT ratios, including the interaction construct, ranged from 0.055 to 0.236, all of which were well below the recommended threshold.

Overall, the HTMT analysis shows that all constructs are sufficiently distinct, thereby establishing satisfactory discriminant validity. At the same time, it confirms the adequacy of the measurement model for further assessment of the structural model.

Hypothesis Testing

The outcomes of hypothesis testing in the structural model indicate the statistical relationships among the major constructs of the study: Digital Technology Orientation (DTO), Attitude Toward Digital Marketing (ATDM), Organizational Readiness (OR), and Adoption of Digital Marketing Technology (ADMT). The analysis examines the direct and moderating relationships among these variables using the path coefficients and significance values obtained from PLS-SEM.

Each route coefficient indicates the strength and direction of the relationship between two constructs, and the p-value indicates whether the relationship is statistically significant or random. A discovery is less than 5% random with a p-value below 0.05. That usually confirms a statistically significant link.

Digital Technology Orientation (DTO) and ATDM are substantially correlated ($p=0.000$). It suggests that organizations with higher PEOU and PU are more positive about digital marketing. The positive correlation highlights the role of technical orientation in shaping organizational attitudes toward digital transformation.

ATDM and ADMT are linked ($p=0.000$). Companies with positive attitudes toward digital marketing are more likely to adopt digital marketing tools. The results confirm ATDM's mediator role in the proposed theory.

Digital Technology Orientation directly improves digital marketing technology adoption by affecting ADMT ($p=0.002$). This suggests that organizations that regard digital technology as an advantage and simple would employ it in their marketing.

Organizational Readiness (OR) moderates DTO-ATDM in the model. Organizational Readiness boosts Digital Technology Orientation's impact on Digital Marketing Attitude ($p = 0.046$). Further infrastructure, management assistance, technology resources, and employee development may help organizations turn their technological orientation into positive digital marketing views and employee readiness.

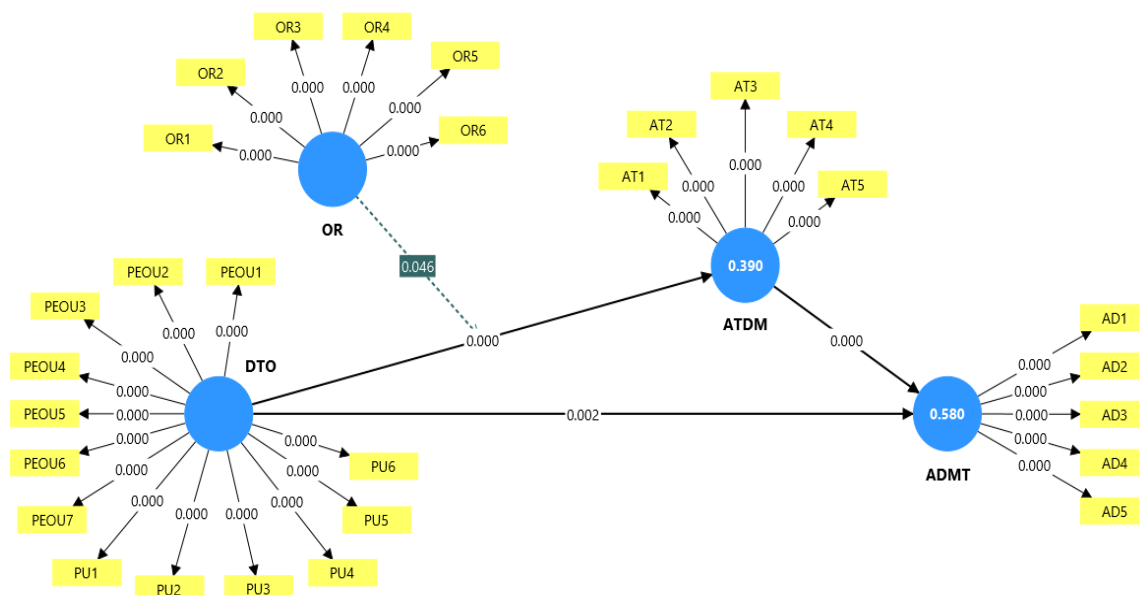


Fig 3: P Value

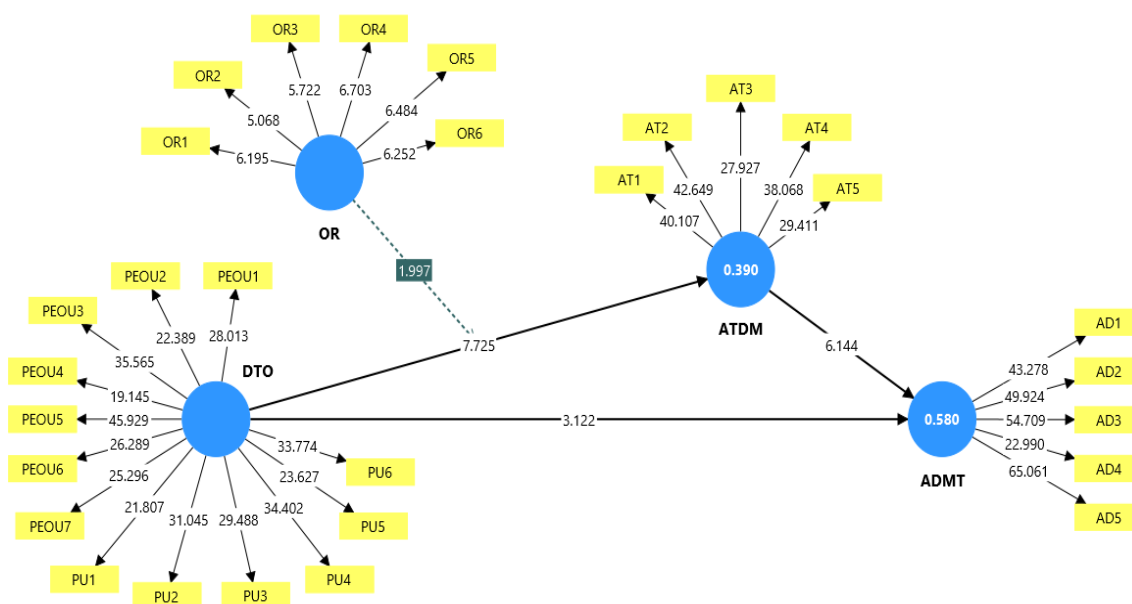


Fig 4: T Value

Direct Effects

Attitude Toward Digital Marketing -> Adoption of Digital Marketing Technology

The path coefficient ($\beta=0.557$) shows a positive relationship between Attitude Toward Digital Marketing (ATDM) and Adoption of Digital Marketing Technology (ADMT). This implies that organizations with positive attitude toward digital

marketing are likely to adopt digital marketing technology. The relationship is highly statistically significant as confirmed by the t-statistic (6.144, $p < 0.001$).

Digital Technology Orientation -> Adoption of Digital Marketing Technology

Digital Technology Orientation (DTO) positively affects the adoption of Digital Marketing Technology (ADMT) as portrayed by the path coefficient ($\beta = 0.284$). This outcome suggests that organizations that see digital technologies as useful and easy to use are more likely to adopt digital marketing technologies. The t-statistic (3.122, $p = 0.002$) indicates that the relationship is statistically significant at the 0.01 level.

Digital Technology Orientation -> Attitude Toward Digital Marketing

The path coefficient ($\beta = 0.598$) suggests a strong positive relationship between the Digital Technology Orientation (DTO) and Attitude Toward Digital Marketing (ATDM). This implies that the more digital-oriented an organization is, the more positive attitudes it is likely to develop towards digital marketing practices. The high t-stat (7.725, $p < 0.001$) further confirms the robustness and significance of the relation.

Moderation Effect

Organizational Readiness $\times$ Digital Technology Orientation -> Attitude Toward Digital Marketing

The interaction effect of Organizational Readiness (OR) and Digital Technology Orientation (DTO) on Attitude Toward Digital Marketing (ATDM) is positive. Path coefficient ($\beta = 0.179$) shows that Organizational Readiness strengthens the relationship between DTO and ATDM. The t-statistic (1.997, $p = 0.046$) also supports the conclusion that the moderation effect is statistically significant at the 0.05 level. The result suggests that firms with greater levels of technological infrastructure, managerial support, and readiness are more likely to translate their digital orientation into positive attitudes towards digital marketing.

Mediation Effect

Digital Technology Orientation -> Attitude Toward Digital Marketing -> Adoption of Digital Marketing Technology

The indirect relationship between Digital Technology Orientation (DTO) and Adoption of Digital Marketing Technology (ADMT) via Attitude Toward Digital Marketing (ATDM) implies that the mediation effect exists in the proposed model. The path coefficient between DTO and ATDM ($\beta = 0.598$, $t = 7.725$, $p < 0.001$) and the path coefficient between ATDM and ADMT ($\beta = 0.557$, $t = 6.144$, $p < 0.001$) are both positive and statistically significant, which confirms the mediating role of Attitude Toward Digital Marketing.

The results suggest that organizations with a higher Digital Technology Orientation are more likely to have positive attitudes towards digital marketing, which in turn enhances the Adoption of Digital Marketing Technology. Therefore, Attitude Toward Digital Marketing transmits the positive effect of DTO to technology adoption outcomes.

Furthermore, the direct relationship between DTO and ADMT is still statistically significant ($\beta = 0.284$, $t = 3.122$, $p = 0.002$), which suggests partial mediation instead of full mediation. This shows that Digital Technology Orientation directly and indirectly affects the adoption of Digital Marketing Technology through Attitude Towards Digital Marketing.

6. DISCUSSION AND CONCLUSION

This study seeks to examine the TAM's dynamic capabilities for adopting digital marketing technology in Uttarakhand MSMEs. Based on the findings, the investigation identifies a positive relationship among the variables and develops a hypothesis. A previous study examined how digital marketing technology accelerates the development of MSMEs in Uttarakhand by enabling output-based, cost-effective digital technology within their firm models. The Technology Acceptance Model (TAM) played a vital role in analyzing the impact on the adoption of digital technology in Uttarakhand MSMEs, and the study supports the current research [72]. The literature supports the adoption of a digital marketing strategy, which has enabled small and medium-sized businesses (SMEs) to gain a competitive advantage over competitors. Organizational Readiness acts as a stimulator and an enabler to operate the process simultaneously [73]. The objective of this research is to measure SMEs' attitudes and influencing factors, while considering the role of information technology in decision-making in SMEs, by analyzing past literature. [74].

This research focused on the use of Digital Marketing Technology (ADMT) amongst MSMEs in Uttarakhand, where associations were made between Digital Technology Orientation (DTO), Attitude Toward Digital Marketing (ATDM) and Organizational Readiness (OR). PLS-SEM method was used in the empirical examination of the theoretical associations that have been proposed. Results show that Digital Technology Orientation is positively related to both Attitude Toward Digital Marketing and the Adoption of Digital Marketing Technology. This implies that firms which have more technological orientation will be more inclined to have positive attitudes towards digital marketing and adoption of digital marketing technology.

7. IMPLICATION

This paper has several theoretical, managerial and policy implications regarding the adoption of digital marketing technology among MSMEs. From the theoretical angle, the findings have extended the use of Technology Acceptance Model by showing that Digital Technology Orientation affects technology adoption via the Attitude toward Digital Marketing. The partial mediation has proven the fact that organizational attitudes are key mediators of the impact of technological orientation on technology adoption. Additionally, the fact that Organizational Readiness significantly moderates the adoption process further stresses the importance of organizational capabilities in the adoption process.

8. LIMITATION AND FUTURE RESEARCH

Limitations of the study need to be discussed when interpreting the results of this paper. First, the research is focused only on MSMEs functioning in Uttarakhand. Therefore, the findings might not be applicable to MSMEs functioning in other Indian states and other geographical and economic environments. Different levels of technological infrastructure, market situation, management skills, and governmental support may affect the adoption of digital marketing technologies in different ways.

Second, the limitations related to sample size and survey coverage have to be mentioned as well. Even though the researchers managed to get 320 answers and used the PLS-SEM approach for analyzing the data collected during the survey, the sample might not represent all the diversity of MSMEs in Uttarakhand. The geographical coverage of the survey might be too limited in order to cover the experience of MSMEs functioning in remote and underdeveloped areas.

Third, the current research relies on quantitative survey data. This approach might not provide an insight into subjective experiences, management problems, organizational issues, and context-related aspects that can affect the process of adopting technology. The existing study also mentions certain limitations related to qualitative data and survey coverage.

Future research may expand on the current study by overcoming the geographical, methodological, and conceptual limitations that exist in the current study. For example, future research may conduct such studies within other Indian states to investigate the adoption of digital marketing technology within MSMEs operating in varying technological, economic, and institutional environments. Future research may also conduct comparative studies in Garhwal and Kumaon regions of Uttarakhand to understand the impact of geographical factors on adoption of digital technologies.

Second, future research needs to include a larger sample size that consists of MSMEs from various sectors such as manufacturing, trading, tourism, hospitality, and services sector. This would help future researchers to understand any difference that exists in the adoption of digital marketing technology due to the enterprise sizes, industry types, and geographical locations. In fact, the current study specifically calls for such research.

Finally, future researchers may also adopt a mixed methods design or a longitudinal design in their research.

AUTHOR CONTRIBUTIONS

Hardev Singh: Conceptualization, Investigation, Writing & Editing.

Dr. Mobin Anwar: Supervision

Dr. Anjali Dimri : Data Curation, Formal Analysis.

CONFLICT OF INTEREST

There is no conflict of interest for the publication of this research article among the authors. The financial, personal, professional or any other relationship has not affected the results or interpretation of this research.

ETHICS STATEMENT

The research has been carried out in accordance with the existing ethical norms and principles of responsible research. Participation in the research was on a voluntary basis and all the respondents were aware of the nature of the research and its extent. Informed consent has been taken from all the participants before conducting the research. The privacy and anonymity of the respondents have been ensured and the data collected have been used only for academic and research purposes. The personal identity of the participants has not been revealed at any stage. The research has followed the ethical norms relevant to the research.

DATA AVAILABILITY STATEMENT

Availability of data and materials

The datasets supporting the conclusions of this article are available on request from the corresponding author. The datasets are not publicly available because of privacy concerns of the participating respondents and institutions. Scientists who are interested in using the data can contact the corresponding author with a justified request.

REFERENCES

- [1] Madushan, A. (2024). The History and Evolution of Digital Marketing.
- [2] YachouAityassine, F. L., & Al-Ajlouni, M. M. (2022). The effect of digital marketing strategy on customer and organizational outcomes. *Marketing i menedžment inovacij*, 13(4), 45-54.
- [3] Busca, L., & Bertrandias, L. (2020). A framework for digital marketing research: investigating the four cultural eras of digital marketing. *Journal of Interactive Marketing*, 49(1), 1-19.
- [4] Martynenko, M., Demchenko, H., & Osypenko, N. (2023). Developing and implementing digital marketing strategies of the future: Toward improving product quality and competitiveness
- [5] Eid, R., Elbeltagi, I., & Zairi, M. (2006). Making business-to-business international internet marketing effective: a study of critical factors using a case-study approach. *Journal of International Marketing*, 14(4), 87-109.
- [6] Dsouza, A., & Panakaje, N. (2023). A study on the evolution of digital marketing. *International Journal of Case Studies in Business, IT, and Education*, 7(1), 95-106.
- [7] Sharma C, Rath P, Kumar R, Sharma S, Chen H-Y. Mapping the Evolution of Digital Marketing Research Using Natural Language Processing. *Information*. 2025; 16(11):942. <https://doi.org/10.3390/info16110942>
- [8] Zhou, Y., & Yang, X. (2024). The evolution and innovation of marketing strategies in the digital era. *Academic Journal of Business & Management*, 6(6), 250-255.
- [9] Seth, V., Jaiswal, S., & Jaiswal, K. S. (2024). Promoting Digital Marketing and Innovative Lending in MSME Industry. *Small*, 7(24.06), 31-95
- [10] Cuijten, N., Wongpun, S., Buaprommee, N., Suwannahong, R., & Inmor, S. (2024). Exploring the digital marketing potential and needs for digital marketing capabilities of service sector MSMEs in Thailand. *Journal of Business Economics and Management*, 25(5), 1052-1074.
- [11] Khaerani, S. N., & Sudarmiatin, S. (2022). The Use of Digital Marketing and Its Impact on Increasing MSME Sales. *Interdisciplinary Social Studies*, 1(8).
- [12] Rawat, R. S., Kothari, H. C., & Chandra, D. (2022). Role of the Digital Technology in accelerating the growth of micro, small and medium enterprises in Uttarakhand: Using TAM (Technology Acceptance Model). *International Journal of technology management & sustainable development*, 21(2), 205-227.
- [13] Martinravi, C. P., & Krishnasamy, K. (2025). Unleashing the potential of MSMEs in India: A strategic analysis. *Journal of the International Council for Small Business*, 6(1), 123-143.
- [14] Kumar, V., & Nanda, P. (2023). Determinants of the success of MSMEs in India: A policy vs. technology perspective. *International Journal of Technology, Policy and Management*, 23(1), 102-122
- [15] Nanda, P., & Kumar, V. (2023). Development of MSMEs in India: challenges vs. Govt policies. *International Journal of Technology, Policy and Management*, 23(3), 245-267.
- [16] Sivasree, C. H. V., & Vasavi, P. (2020). MSMES in India-growth and challenges. *Journal of Scientific Computing*, 9(2), 126-137.

- [17] Boateng, K., Sodem, N., & Nagaraju, Y. (2019). The contribution of MSMEs to the growth of the Indian and global economy. Boateng, K. Naveem, S., Nagaraju, Y.(2019). The Contribution of MSMEs to the Growth of the Indian and Global Economy. RESEARCH REVIEW International Journal of Multidisciplinary, 4(3).
- [18] Kumari, R. L. (2018). India's digital transformation: Driving MSME growth.
- [19] Panwar, D. (2024). Problems And Issues Of Micro Small & Medium Enterprises (Msmes) In Garhwal District Of Uttarakhand, India. Educational Administration: Theory And Practice, 30(5), 6738-6744.
- [20] Bisht, R. K., Bisht, I. P., & Joshi, B. C. (2022, November). Growth of micro, small and medium enterprises (MSMEs) in Uttarakhand (India). In AIP Conference Proceedings (Vol. 2481, No. 1, p. 040003). AIP Publishing LLC.
- [21] Khaerani, S. N., & Sudarmiatin, S. (2022). The Use of Digital Marketing and Its Impact on Increasing MSME Sales. Interdisciplinary Social Studies, 1(8).
- [22] Yaniar, N., Sasono, A. D., Sukoco, A., & Rosyid, A. (2021). Financial technology and digital marketing on MSMEs and their impact on financial performance and business sustainability. IJEBD (International Journal of Entrepreneurship and Business Development), 4(6), 828-838.
- [23] Setiawan, R., Prasetyo, P. T., & Yuniawan, A. (2025). Digital marketing strategy for sustainable performance of MSMEs: literature review. Research Horizon, 5(1), 33-46.
- [24] Jadhav GG, Gaikwad SV, Bapat D (2023), "A systematic literature review: digital marketing and its impact on SMEs". Journal of Indian Business Research, Vol. 15 No. 1 pp. 76–91, doi: <https://doi.org/10.1108/JIBR-05-2022-0129>
- [25] Vania, A., & Fikriah, N. L. (2023). The impact of creative digital marketing on the sustainability of MSME businesses: A mediating role of marketing performance. Jurnal Ilmiah Manajemen Dan Bisnis, 8(2), 141-150.
- [26] Atika, A. (2023). The effect of digital marketing and knowledge management on the marketing sustainability of MSMEs in Indonesia. The Eastasouth Management and Business, 2(01), 83-92.
- [27] Díaz-Pelaez, A., Clemente-Almendros, J. A., Saldaña-Larrondo, D. E., & Erasso-Arango, N. (2025). Confronting Digital Strategic Orientation and Digital Technologies on MSMEs' Performance in Emerging Countries. Canadian Journal of Administrative Sciences/Revue Canadienne des Sciences de l'Administration.
- [28] Putra, A. R., & Darmawan, D. (2022). Competitive Advantage of MSMEs in Terms of Technology Orientation and Entrepreneurship Competence. International Journal of Service Science, Management, Engineering, and Technology, 2(1), 15-20.
- [29] Mamduh, A., & Pratikto, H. (2021). Technology orientation and innovation capability in the digital transformation process of SMEs: A review. International Journal of Research in Business and Social Science (2147-4478), 10(8), 76-81.
- [30] Sugangga, R., Sudarmiatin, S., & Wardana, L. W. (2023). A systematic literature review of the digital orientation of MSMEs. International Journal of Economics and Management Research, 2(3), 171-180.
- [31] Sugangga, R., Sudarmiatin, S., & Wardana, L. W. (2023). A systematic literature review of the digital orientation of MSMEs. International Journal of Economics and Management Research, 2(3), 171-180.
- [32] The Eastasouth Management and Business (Vol. 4, Issue 02). (2026). PT. Sanskara Karya Internasional.
- [33] Tseng, S.-M. (2025). Determinants of the intention to use digital technology. Information (Basel), 16(3), 170. <https://doi.org/10.3390/info16030170>
- [34] Qu, C., & Kim, E. (2025). Investigating AI adoption, knowledge absorptive capacity, and open innovation in Chinese apparel MSMEs: An extended TAM-TOE model with PLS-SEM analysis. Sustainability, 17(5), 1873. <https://doi.org/10.3390/su17051873>
- [35] Xavier, B., & Vanitha, A. (2025). What drives digital marketing adoption in resource-constrained MSMEs? Evidence using a TOE-led integrative framework. International Review of Management and Marketing, 16(1), 187–198. <https://doi.org/10.32479/irmm.21575>
- [36] Abbas, A. (2021). Understanding digital marketing adoption in India: integrated by technology acceptance model (TAM) and theory of planned behaviour (TPB) framework. Journal of Management Sciences.
- [37] Putri, E., & Bandi, B. (2023). Financial Attitude, Marketing Strategy, Locus of Control, And Self-Efficacy on MSME Performance. The International Journal of Business Management and Technology, 7(2), 465-478.
- [38] Pramesthy, W. E., Dini, P. M., Budiman, M. A., Esharja, Z. A., & Kartiasih, F. (2024). The effect of E-commerce on Gross Regional Domestic Product and clustering of its characteristics by utilizing official statistics and big data. Journal of Economics Business and Accountancy Ventura, 27(1). <https://doi.org/10.14414/jebav.v27i1.4136>

- [39] Wahyudin, M., Muhammad, N. A., Supartono, W., Chen, C. C., & Tsai, K. M. (2022). MSMEs' technology readiness: Indicator and index in adopting digital marketing. *Advances in Biological Sciences Research*.
- [40] Novitasari, D., Goestjahjanti, F. S., Rahardja, U., Santoso, S., Sihotang, S. V., Santoso, N. A., & Cesna, G. P. (2025, August). Optimizing msme performance through marketing capabilities and digital marketing adoption. In *2025 4th International Conference on Creative Communication and Innovative Technology (ICCIT)* (pp. 1-7). IEEE.
- [41] Juita, R., Inan, D. I., & Santoso, B. (2026). Digital market adoption by underserved MSMEs in developing countries: Mediation and moderation by self-efficacy and trust. *International Journal of Information Management Data Insights*, 6(1), 100384.
- [42] Arridho, A., Sinaga, B. O., Hartono, H., & Syahchari, D. H. (2025, August). Digital Technology Adoption and Business Growth in Indonesian MSMEs Using PLS-SEM. In *2025 4th International Conference on Creative Communication and Innovative Technology (ICCIT)* (pp. 1-6). IEEE.
- [43] Lestari, N. S., Rosman, D., & Triana, I. (2024). Analyzing the effect of innovation and strategic planning on MSME performance, utilizing technology adoption as a moderator. *Procedia Computer Science*, 245, 500-507.
- [44] Díaz-Arancibia, J., Hochstetter-Diez, J., Bustamante-Mora, A., Sepúlveda-Cuevas, S., Albayay, I., & Arango-López, J. (2024). Navigating digital transformation and technology adoption: A literature review from small and medium-sized enterprises in developing countries. *Sustainability*, 16(14), 5946.
- [45] Adjeng, M., & Handayani, Y. I. (2024). Technology adoption challenges and marketing strategies for MSMEs in Surabaya: A qualitative study. *Jurnal Manajemen*, 21(2), 111-131.
- [46] Kumar, A., Syed, A. A., & Pandey, A. (2021). Adoption of online resources to improve the marketing performance of SMES. *Asia Pacific Journal of Health Management*, 16(3), 137-144.
- [47] Singh, T., & Kalia, P. (2021). MSME owner/manager perceptions towards the adoption of e-marketing activities in india. In *Recent Developments in Individual and Organizational Adoption of ICTs* (pp. 43-59). IGI Global.
- [48] Raj, A., Shukla, D., Quadir, A., & Sharma, P. (2024). What drives the adoption of digital technology in the micro, small, and medium enterprises sector in a developing economy?. *Journal of Business & Industrial Marketing*, 39(9), 1984-2002.
- [49] Soomro, R. B., Memon, S. G., Dahri, N. A., Al-Rahmi, W. M., Aldriwish, K., A. Salameh, A., ... & Saleem, A. (2024). The adoption of digital technologies by small and medium-sized enterprises for sustainability and value creation in Pakistan: The application of a two-staged hybrid SEM-ANN approach. *Sustainability*, 16(17), 7351.
- [50] Su, J., Zhang, Y., & Wu, X. (2023). How market pressures and organizational readiness drive digital marketing adoption strategies' evolution in small and medium enterprises. *Technological Forecasting and Social Change*, 196, 122655
- [51] Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478
- [52] Egodawele, M., Seder, D., & Bui, V. (2022). A systematic review of digital transformation literature (2013–2021) and the development of an overarching apriori model to guide future research. *arXiv*.
- [53] Jewapatarakul, D. (2024). Digital organizational culture, organizational readiness, knowledge acquisition, and digital transformation in SMEs. *SAGE Open*, 14(4).
- [54] Yoon, C. (2023). Factors affecting the adoption of digital marketing in non-profit organizations. *Administrative Sciences*, 14(1), 10
- [55] Aboelmaged, M. G. (2014). Predicting e-readiness at firm-level: An analysis of technological, organizational and environmental effects on e-maintenance readiness in manufacturing firms. *International Journal of Information Management*, 34(5), 639–651
- [56] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340.
- [57] Chatterjee, S., & Kumar Kar, A. (2020). Why do small and medium enterprises use social media marketing and what is the impact? Empirical insights from India. *International Journal of Information Management*, 53, 102103.
- [58] Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, 122, 889–901
- [59] Dwivedi, Y. K., Hughes, L., Ismagilova, E., et al. (2021). Artificial intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, 57, 101994

- [60] Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211.
- [61] Kane, G. (2019). The technology fallacy: people are the real key to digital transformation. *Research-technology management*, 62(6), 44-49.
- [62] Tornatzky, L. G., & Fleischer, M. (1990). *The Processes of Technological Innovation*. Lexington Books
- [63] Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Canonical correlation: A supplement to multivariate data analysis. *Multivariate Data Analysis: A Global Perspective*, 7th ed.; Pearson Prentice Hall Publishing: Upper Saddle River, NJ, USA.
- [64] Westland, J. C. (2010). Lower bounds on sample size in structural equation modeling. *Electronic commerce research and applications*, 9(6), 476-487.
- [65] Hair JF, Risher JJ, Sarstedt M, Ringle CM. When to use and how to report the results of PLS-SEM. *European business review*. 2019 Jan 14;31(1):2-4
- [66] Bryman, A. (2016). *Social Research Methods*. United Kingdom: Oxford University Press.
- [67] Creswell, J. D., Pacilio, L. E., Lindsay, E. K., & Brown, K. W. (2014). Brief mindfulness meditation training alters psychological and neuroendocrine responses to social evaluative stress. *Psychoneuroendocrinology*, 44, 1–12. <https://doi.org/10.1016/j.psyneuen.2014.02.007>
- [68] Hair Jr, J. F., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: updated guidelines on which method to use. *International Journal of multivariate data analysis*, 1(2), 107-123.
- [69] Ringle, C., Da Silva, D., & Bido, D. (2015). Structural equation modeling with the SmartPLS. *Bido, D., da Silva, D., & Ringle, C. (2014). Structural Equation Modeling with the Smartpls. Brazilian Journal Of Marketing*, 13(2).
- [70] Hair, J. F., Astrachan, C. B., Moisescu, O. I., Radomir, L., Sarstedt, M., Vaithilingam, S., & Ringle, C. M. (2021). Executing and interpreting applications of PLS-SEM: Updates for family business researchers. *Journal of Family Business Strategy*, 12(3), 100392.
- [71] Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the academy of marketing science*, 43(1), 115-135.
- [72] Rawat, R. S., Kothari, H. C., & Chandra, D. (2022). Role of the Digital Technology in accelerating the growth of micro, small and medium enterprises in Uttarakhand: Using TAM (Technology Acceptance Model). *International Journal of technology management & sustainable development*, 21(2), 205-227.
- [73] Su, J., Zhang, Y., & Wu, X. (2023). How market pressures and organizational readiness drive digital marketing adoption strategies' evolution in small and medium enterprises. *Technological Forecasting and Social Change*, 193, 122655.
- [74] Kadadevaramath, R. S., Chen, J. C., & Sangli, M. (2015). Attitude of small and medium enterprises towards implementation and use of information technology in India-an empirical study. *International Journal of Business and Systems Research*, 9(2), 123-137.