

X-Gen Women Entrepreneur Competence Behavior with Tech

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Abstract

Self-Help Groups (SHGs) are critical in empowering female entrepreneurs by promoting self-employment and economic prospects. These groups promote entrepreneur empowerment events and encourage members to adopt competitive behavioral norms. However, despite SHG aid, Generation X (Gen-X) women entrepreneurs have difficulties in adopting technology, reducing their competitiveness. This study investigates the influence of technology adoption on competitive behavioral practices among Gen-X women entrepreneurs within SHGs in India. Drawing on the Theory of Planned Behavior and Technology, a questionnaire adapted from prior research is utilized, employing a five-point Likert scale. Structural Equation Modeling (SEM) with technology adoption as a moderator is conducted using Partial Least Squares (PLS). Data collection involves convenience sampling, with 230 respondents in the final analysis. The study initially assesses reliability and validity, then conducts path analysis, and finally employs bootstrapping via SMART-PLS. The results indicate that Gen-X women in SHGs demonstrate significant positive entrepreneurial competency behaviors, and similarly, the analysis on technology adoption moderation also shows positive significance. The study suggests that providing training and resources to enhance technology-driven entrepreneurship can promote gender-based social equity and inclusion. It underscores the importance of managerial and policymaker support in facilitating technology adoption among women entrepreneurs in SHGs, thus bolstering their competitiveness in the contemporary business milieu.

Keywords: Entrepreneur, Mobile, PLS-SEM Analysis, SHGs, TPB and Competency

Introduction

Self Help Groups (SHGs) play a crucial role in promoting women's empowerment and alleviating poverty by improving their income and financial status (1). These SHGs encourage women to venture into entrepreneurship through training programs (2), thereby fostering employment generation, income growth, and poverty alleviation among various generations, including X, millennials, and Z (3). As entrepreneurship practices become increasingly competitive due to environmental changes, technological advancements play a significant role in supporting entrepreneurial operations (4, 5).

Female entrepreneurs are using mobile technology to advertise and sell a variety of goods and services on popular social media platforms (6, 7). By efficiently utilizing mobile technology, entrepreneurs can manage business operations, improve communication, and enhance consumer engagement activities, thereby enhancing their competitiveness (5). However, there is a variance in mobile technology usage (8) intention behaviour among different generations, particularly among X generation (Gen-X)

members, who were born between the middle of the 1960s and the early 1980s (9, 10). The Gen-X, while lacking the natural affinity for technology seen in younger generations, still prefers shopping in physical stores that offer high-quality goods and services (11). Nonetheless, Gen-X SHG women entrepreneurs may face challenges in adopting new technologies and may have distinct interests. Therefore, digital literacy and inclusion are essential for them to effectively utilize mobile technology in their entrepreneurial endeavours (12, 13). Some Gen-X women entrepreneurs are successfully managing their entrepreneurial activities through mobile technology, which support the competency behaviour in their entrepreneurial practices (14).

This study formulates two key research questions to investigate Gen-X SHG women entrepreneurs:

1. Does the demonstration of competitive behavior influence the entrepreneurial intentions of Gen-X SHG women?
2. How does the utilization of mobile technology affect the competitive entrepreneurial practices of Gen-X SHG women?

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The research question explores whether competitive behavior influences the entrepreneurial intentions of Gen-X SHG women and investigates how mobile technology impacts their entrepreneurial practices. Using the Theory of Planned Behavior, it examines the factors influencing competency in entrepreneurial behavioral practices and entrepreneurial intentions (9), highlighting the moderating role of technology in shaping these dynamics.

The Theory of Planned Behavior (TPB), building upon the foundation of the Theory of Reasoned Action (TRA), delves into the factors influencing both the intention to behave and the actual

adoption of behaviors (Figure 1) (15). Within TPB, subjective norms, perceived behavioral control, and attitude emerge as the principal components (16). Behavioral intention, a central concept, is directly linked to perceived behavioral control, which plays a pivotal role in TPB (17, 18), representing an individual's belief in their ability to effectively manage their behavior.

This theoretical framework is particularly pertinent in evaluating the connection between entrepreneurial intention and competitive behavioral practices (5), as well as the impact of technology use on such practices among Gen-X SHGs women entrepreneurs.

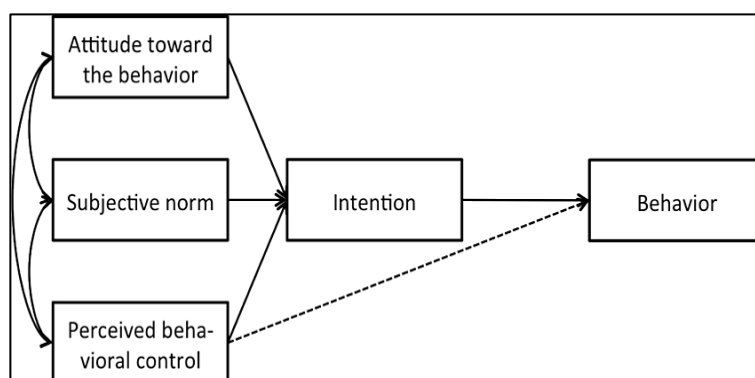


Figure 1: Theory of planned behavior

This study endeavors to investigate whether the utilization of mobile technology moderates the association between competitive entrepreneurial practices by Gen-X SHGs women in India.

The primary objectives are to address the above questions:

1. To find the X-Gen entrepreneur demographic profile and type of enterprises practices in Chittoor Dist.
2. To examine whether the demonstration of competitive behavior influences the entrepreneurial intentions of Gen-X SHG women.
3. To investigate how the utilization of mobile technology affects the competitive entrepreneurial practices of Gen-X SHG women.

The primary objectives of this study are to explore whether the demonstration of competitive behavior influences the entrepreneurial intentions of Gen-X SHG women and to investigate how the utilization of mobile technology affects their competitive entrepreneurial practices.

Extensive literature confirms that competitive behavior predicts entrepreneurial intentions and success. Traits like striving for excellence,

innovation, and resilience are crucial for achieving entrepreneurial goals, as consistently shown in peer-reviewed studies across national and international journals.

Discriminant analysis (19) showed a significant difference (95% confidence) in entrepreneurial competences between SHG members and non-members (19), indicating SHGs support members' entrepreneurial skill development, fostering micro-entrepreneurship (20–22).

The study found that individual intentions in entrepreneurship are shaped by attitude, subjective norms, and perceived behavioral control (23, 24). These factors are pivotal in modeling entrepreneurial behavior, linking personal traits to business goals (17, 25). Essential entrepreneurial qualities like attitude and behavior significantly influence company success. The study highlights a correlation between behavioral foundations and competence (22), focusing on human attributes that facilitate entrepreneurial tasks and assess managerial and entrepreneurial success (19).

The Attitude refers to an individual's internal variables that have been developed to evoke

positive or negative responses to a stimulus (25). These reactions are impacted by the individual's ideas about the consequences of their actions (26). In the context of entrepreneurial conduct, attitudes refer to the difference between one's propensity to self-employment and tendency to pursue entrepreneurship as a vocation (27). SHG members developed an entrepreneurial mentality through training, resulting in a long-term commitment to entrepreneurial growth aspirations (28).

H1: There is positive relationship between Attitude and Entrepreneur Intention.

Subjective norms are the perceived social pressure and influence imposed by relevant persons, such as friends, family, and coworkers, on behavior and decision-making (29, 30). When colleagues in a SHG validate an individual's desire to establish a firm, it has a positive influence on their entrepreneurial intention (21, 31).

H2: There is positive relationship between Subjective norms and Entrepreneur Intention.

Believing in the probable success of a company endeavor increases entrepreneurs' self-efficacy and confidence, motivating them to pursue their goals with optimism (32). Access to entrepreneurial information reinforces this conviction in their talents. Confidence increases with perceived success possibilities, boosting risk-taking and resilience (33). Such empowerment influences entrepreneurial behaviour by improving qualities such as confidence, decision-making, problem-solving, and flexibility (30). Positive views of perceived behavioral control encourage a proactive intention, and contributes to total entrepreneurial competence behaviour.

H3: There is a positive relationship between Perceived behavioural control and Entrepreneur Intention.

H4: There is a positive relationship between Perceived behavioural controls to Competitive Entrepreneur Behaviour.

Examining the idea that entrepreneurial intention predicts outcome behaviours such as opportunity identification, entrepreneurial efforts, and increased entrepreneurial effectiveness (34). Emphasize the substantial relationship between entrepreneurial intention and behavioural practices (25, 35), claiming that aspirations accurately predict future entrepreneurial activity. However, it is critical to recognize that individuals'

intentions do not always transfer into actual behavior (30).

H5: There a positive relation between intentions to Competitive Entrepreneur behaviour.

Moderating Variables

The study highlighted mobile technology's crucial role in creating business opportunities, supported by user perceptions (8). Benefits include enhanced marketing tools and improved production, fostering entrepreneurial skills. Previous research (7, 11), similarly noted user preference for e-wallets due to discounts and incentives (8). Gender significantly influences technology adoption among entrepreneurs, shaping their strategies and outcomes.

This study highlights the need for competitive strategies to retain market share through ongoing product/service improvements (5). It evaluates companies' success relative to competitors based on performance and profitability metrics (36, 37). Moreover, it shows a strong link between technology use and job engagement (38), stressing the importance of both adoption and proficiency for enhancing engagement. Finally, it examines how urban African women utilize social media platforms for accessing economic opportunities (39). Similarly, the study (18, 27) investigates how street merchants use mobile devices to expand their markets, highlighting challenges and limited profitability at various market stages. Benefits include cost savings in advertising, marketing, customer support, and order processing.

An examination was conducted into the usage of mobile technology systems by female entrepreneurs from Gen-X SHGs in a growing market. The study aims to evaluate the impact of mobile technology and entrepreneurial competitive behavior on this demographic. Using PLS-SEM analysis and the TPB, the study developed an expanded that focused on perceived behavioural control as a crucial predictor of behavior towards mobile technology systems. However, there are still concerns about the usage of mobile technology. Some studies indicate that intention and perceived behavioural control have a positive influence, whereas others demonstrate a negative correlation. The relationship between technology use and competitive behaviour is uncertain.

H6: The relationship between intention and behavior is positively moderated by technology usage.

H7: The relationship between perceived behavioral control and behavior is positively moderated by technology usage.

This study tries to match with the competent behavioural patterns of X-Generation women about technology use. The study's findings revealed that the usage of mobile technology systems improves the competitive behaviour and performance of Gen-X SHG female entrepreneurs (8, 40).

Research Conceptual Model

This study seeks to broaden our understanding by looking at the unique obstacles and opportunities that female Gen-X entrepreneurs encounter while working with SHGs. It examines the elements that influence their capacity to navigate and prosper in the digital age. The study builds on prior research findings in this area. The study design used in this study, depicted in Figure 2, permits the evaluation and enhancement of prior inquiries into the aspirations of women entrepreneurs (41).

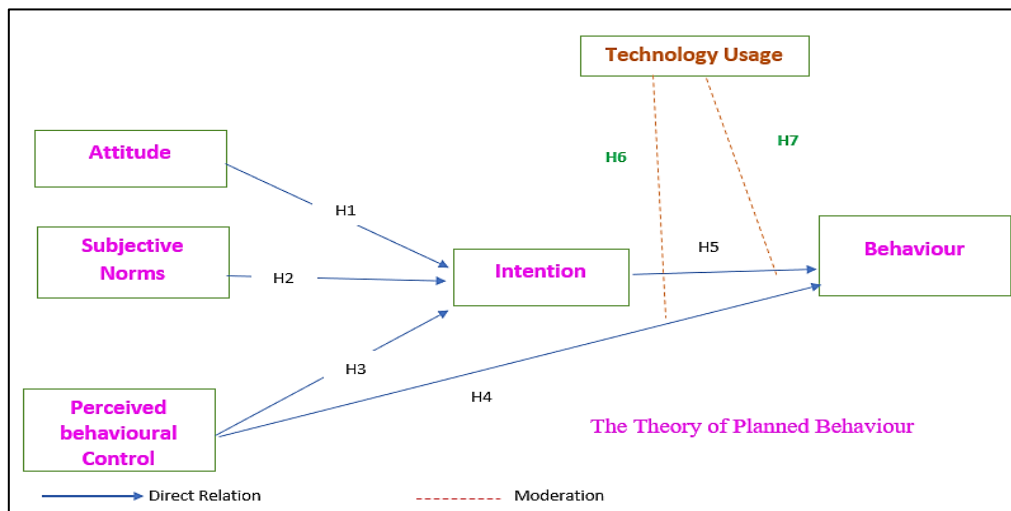


Figure 2: Research Frame Work

The conceptual study is framed using the Theory of Planned Behavior (TPB), which is used to understand the determinants of competency behavioral practices and entrepreneurial intentions among Gen-X SHG (Self-Help Group) women. The key focus is on how mobile technology impacts these entrepreneurial behaviors and intentions, highlighting its potential to enhance or modify these competencies and practices.

Methodology

The study employed SMART PLS for descriptive and hypothetical analyses, assessing primary and secondary data on Generation X SHG female entrepreneurs' competency and behavioral performance. Methodologically, PLS-SEM underpins the study, leveraging the TPB to explore mobile technology's role in supporting entrepreneurial activities and overcoming competitive barriers (8). A robust literature review informed framework development and hypothesis formulation, leading to meticulously crafted survey instruments distributed among

Generation X SHG female entrepreneurs. Rigorous validity and reliability checks preceded SEM analysis using SMART-PLS. While ample research exists on technology in Generation X entrepreneurship, gaps remain in evaluating their entrepreneurial competencies and behaviors influenced by technology use.

The population under scrutiny consisted of SHG women entrepreneurs recommended by Gen-X influencers, aged between 41 and 60 years (born between 1981 and 1961), age ranges. Prior to the main study, a pre-test was conducted, distributing personal questionnaires until 25 responses were obtained, with pre-test responses excluded from the study. Data collection occurred from August to October 2023, utilizing a well-structured questionnaire and semi-administrative interview schedule. Convenience sampling was employed to distribute the questionnaire to 300 respondents over 45 days in Chittoor District, Andhra Pradesh, India. Of the distributed questionnaires, 272 were returned filled out, with 42 considered insufficient.

Subsequently, 230 completed questionnaires were selected for hypothesis measurement using Smart-PLS. In empirical investigations, using validated measuring scales (Table 1) and items are adopted for correct evaluation. The use of mobile technology is adapted (42), while entrepreneurial practises are taken from Yang *et al.*, (2022). Using a 5-point Likert scale (1 indicates "strongly disagree," 5 indicates "strongly agree,"). This study provides consistency and comparison with prior study by using known measuring scales and employing a standardised method. This study utilizes quantitative study methodology, employing PLS-SEM for data analysis using Smart PLS software (43–45). Since of the intricacy of the study model with 22 indicators. The study used a two-step process, the first phase entailed analyzing the model to determine its reliability and validity, while the second involved evaluating the structural model to determine the connections between variables and the model fit (44, 46). The SEM will look at the relationships between numerous characteristics affecting Gen-X SHG women, such as attitude, behaviour, behaviour control, intention, subjective norm, and technology

usage. To test the reliability and validity of the model presented in Tables 1 and 2, metrics such as "reliability," "internal consistency reliability," "convergent validity," and "discrimination validity" were used. The composite reliability indicators exceeded the threshold of 0.7. Additionally, the Average Variance Extracted (AVE) for each Composite Reliability criterion of 0.5, as established by previous studies (45). The study is referenced in the analysis (3), which use the SMART PLS-SEM technique and specializes on Gen-X SHGs women.

Results

Finally, 230 respondents' data was summarized demographically, data validity and reliability were observed using a measurement model, and the hypothesis was tested using bootstrapping and SMAT PLS (45). The data collected from X-gen SHG women entrepreneurs, categorized by mandal and enterprise type, offers valuable insights into their performance. Table 1 details three main enterprise categories: Food, Vegetables and Fruits, and Fancy and Garments.

Table 1: Geographical Entrepreneur practices Data Collection

S. No	Mandal	Food	Vegetables and Fruits	Fancy and Garments	Total Respondents
1	Nindra	12	9	10	31
2	Punganoor	13	23	16	52
3	Gudipala	7	13	9	29
4	Rompicherla	5	6	11	22
5	Tavanampalli	13	26	18	57
6	Gudupalli	10	12	17	39
	Total Respondents	60	89	81	230

Across six mandals, 230 respondents participated. Tavanampalli had the highest participation [57], notably strong in Vegetables and Fruits (26 respondents). Punganoor followed closely with 52 respondents, showing balanced engagement across all categories, with emphasis on Vegetables and Fruits (23 respondents). Rompicherla had the fewest respondents [22], potentially indicating lower entrepreneurial engagement. Gudipala and Gudupalli had 29 and 39 respondents respectively, with Gudupalli showing a preference for Fancy and Garments (17 respondents). Nindra had 31 respondents, indicating moderate engagement across all categories.

Table 2 shows a variety of demographic factors, including education, income level, and social class, with an emphasis on measuring competent behavior within the TPB paradigm of Gen-X SHG women (47). The mean and standard deviation values for each demographic attribute provide useful information about the data's central tendency and variability. For the variable "Education," a large percentage of participants (31.30%) lack formal education, whereas a substantial number have completed elementary school (20.87%) and SSC (23.48%). This material focuses on the individuals' different educational backgrounds. In terms of "Income Level," the

findings suggest that a substantial majority of participants (34.35%) earn less than Rs 20,000 per year, with 29.13% earning between Rs 20,001 and Rs 40,000.

Table 2: Demographic Summary

Demographic Factor	No	Percentage	Mean	Standard Deviation
Education				
No Education	72	31.30		
Primary	48	20.87	57.5	10.25
SSC	54	23.48		
Intermediate	56	24.35		
Income Level				
Up to 20000	79	34.35		
20001 - 40000	67	29.13		
40001 – 60000	53	23.04	46	30.43
60001 – 80000	27	11.74		
Above 80000	4	1.74		
Social Status				
OC	90	39.13		
BC	49	21.30		
SC	55	23.91	46	30.27
ST	12	5.22		
Not to say	24	10.43		

The majority of participants (39.13%) belong to OC (Other Castes), with fewer in ST (Scheduled Tribes). Mean and standard deviation values highlight central tendency and variability, crucial for grasping X Generation SHG women's behavior within the TPB paradigm. This distribution underscores their economic diversity, essential for understanding their conduct within the TPB model.

Measurement Model, Reliability and Validity

Figure 1 confirms data validity and reliability, while Table 3 assesses construct collinearity using VIF, all below 5, indicating no issues. This suggests manageable multicollinearity among independent variables (48).

Table 3: Outer Loading, and Reliability

	Adoption Source	Factor Value	VIF	Cronbach's Alpha	rho_A	Composite Reliability	AVE
Atitude_1	Amofah and	0.821	1.711	0.813	0.817	0.877	0.641
Atitude_2	Saladrigues,	0.764	1.554				
Atitude_3	2022 (4)	0.798	1.65				
Atitude_4		0.819	1.826				
BP_1	and	0.753	1.443	0.820	0.844	0.894	0.738
BP_2	Slinger <i>et al</i> ,	0.914	2.684				
BP_4	2024 (42)	0.901	2.541				
IP_1		0.812	1.818	0.870	0.875	0.912	0.721
IP_2		0.85	2.151				
IP_3		0.83	1.903				
IP_4		0.866	2.293				
PC_1		0.877	2.532	0.860	0.861	0.905	0.705
PC_2		0.785	1.692				
PC_3		0.893	2.748				
PC_4		0.838	2.081				
SN_1		0.868	2.248	0.830	0.842	0.887	0.664

SN_2	0.78	1.63				
SN_3	0.871	2.235				
SN_4	0.731	1.495				
Tec_1	0.819	1.786	0.796	0.817	0.88	0.711
Tec_2	0.907	2.168				
Tec_3	0.799	1.539				

Factor loadings above 0.7 indicate strong correlations between observed variables and latent constructs, ensuring reliability (35). Cronbach's alpha values in the SEM model Attitude: 0.813, Behavior: 0.82, Behavior Control: 0.87, Intention: 0.86, Subjective Norm: 0.83, Technology Usage: 0.796% confirm high internal consistency and reliability of the threshold value used (49). The rho_A values for the moderation model are Technology Usage: 0.817, Subjective Norm: 0.842, Behaviour: 0.844, Behaviour Control: 0.875, Intention: 0.861. The threshold value for the

constructs showed high reliability and internal consistency, according to the consistent rho_A values. The Composite Reliability consistency was evaluated using composite reliability scores, which varied from 0.877 to 0.912. These numbers are above the 0.7 criterion (49), which indicates strong dependability (36). The constructs, indicated by AVE values ranging from 0.641 to 0.738, explain a substantial portion of variability in their measures. AVE values above 0.5 are generally deemed acceptable for construct validity (49).

Table 4: Discriminant Validity

	Attitude	Behaviour	Behaviour Control	Intention	Subjective Norm	Technology Usage
Attitude	0.801					
Behaviour	0.728	0.859				
Behaviour Control	0.783	0.831	0.849			
Intention	0.788	0.825	0.749	0.839		
Subjective Norm	0.656	0.674	0.744	0.762	0.815	
Technology Usage	0.727	0.835	0.732	0.792	0.665	0.843

The summary of Table 4: The discriminant validity may be determined by comparing the square root of the Average Variance Extracted (AVE) for each construct with correlations across components. Given that the AVE square root that is larger than any of these associations of construct correlation value (49).

The Heterotrait-Monotrait Ratio (HTMT) is a statistic used in Structural Equation Modeling (SEM) to evaluate discriminant validity, which indicates how dissimilar constructs are from one another. Table 5 depicts the HTMT values for each pair of constructs.

Table 5: Heterotrait - Monotrait Ratio (HTMT)

	Attitude	Behaviour	Behaviour Control	Intention	Subjective Norm	Technology Usage
Attitude						
Behaviour	0.728					
Behaviour Control	0.783	0.831				
Intention	0.788	0.825	0.749			
Subjective Norm	0.656	0.674	0.744	0.762		
Technology Usage	0.727	0.835	0.732	0.792	0.665	

Given that a (18) HTMT ratio of 0.900 or below is acceptable for SEM analysis, we discover that all values in the table are less than this threshold. The model is thought to have strong discriminant validity, which improves the robustness of the SEM analysis findings (50).

Results

The construct reliability investigation demonstrates that the measurement items used for the components in the Smart PLS-SEM analysis of Gen-X SHG Women provide accurate and

consistent measures of their respective latent constructs. The study focused on TPB model testing (Figure 3) and technology usage's (Moderate) influence on behavior (Figure 4). Table 7 displays the results of the behaviour model for Gen-X SHGs women entrepreneurs, which included technology usage as a moderating factor. The Table 6 includes path coefficients and other relevant statistics. The route coefficients indicate the intensity and direction of the relationships between the variables in the behavior model.

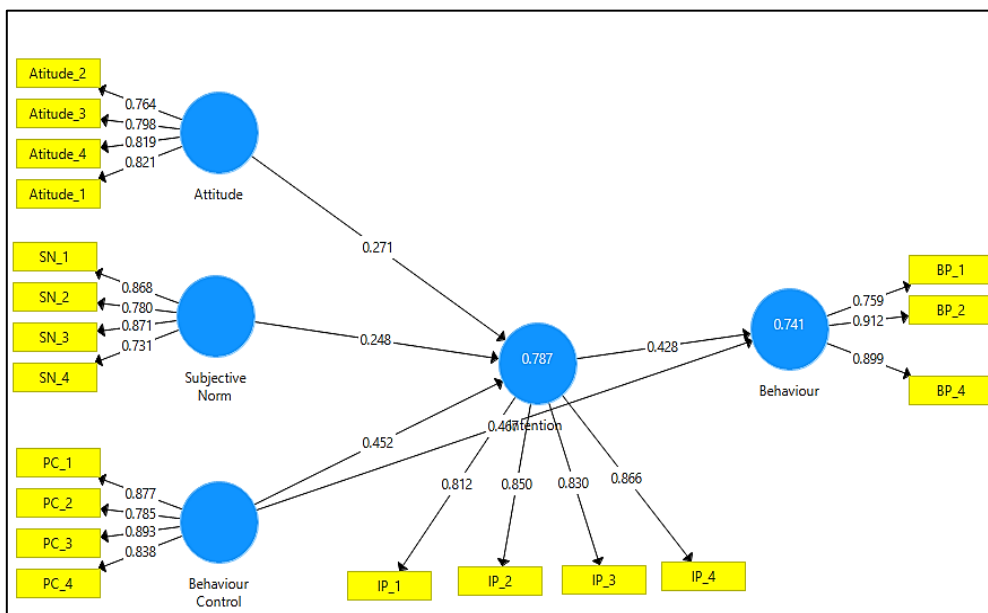


Figure 3: Competence Behavioral Measurement

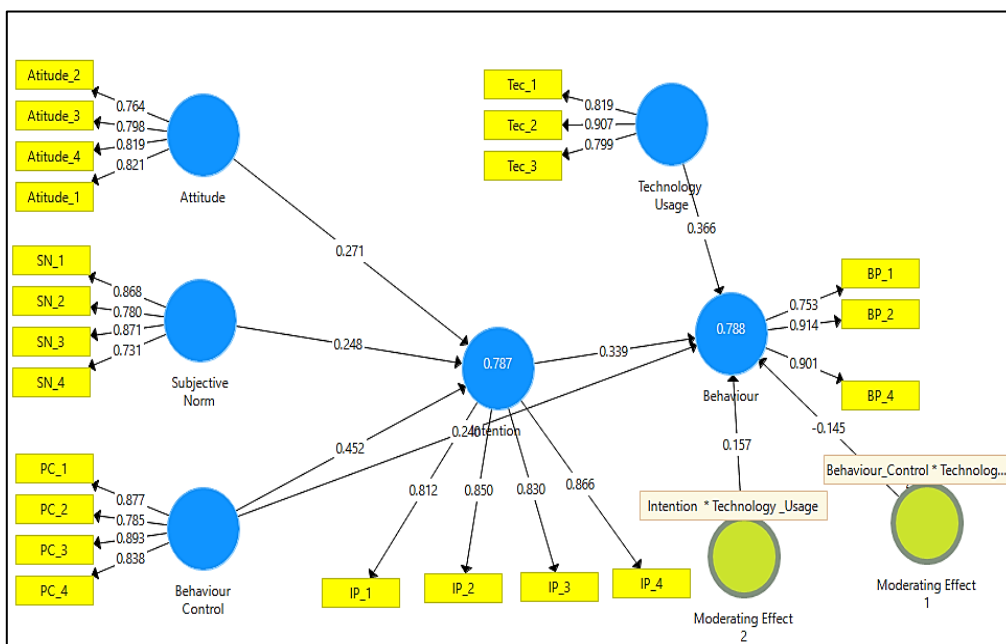


Figure 4: Competence Behavioral Measurement with Technology Adoption

Bootstrapping Path Coefficient

According to Table - 6 findings, behaviour control positively effects behaviour (0.24, p 0.01), attitude considerably influences intention (0.271, p 0.01), and behaviour control significantly influences behaviour (0.453, p 0.01). In turn, intention has an impact on behaviour (0.34, p 0.01). The important connections between different variables. For instance, attitude has a positive effect on intention, behaviour control has a positive impact on behaviour and intention, intention has a positive

impact on behaviour, and subjective norm has a good impact on intention (13). The data also shows moderating effects that have statistically significant effects on behavior (p 0.05), denoted as Moderating Effects 1 and 2. Additionally, technology use significantly affects behavior (0.367, p 0.01) and subjective norm favorably effects intention (0.248, p 0.01). While Intention to Technology usage impact demonstrates a positive association with behavior, Perceived behavior to Technology usage demonstrates a negative behavior production.

Table 6: Bootstrapping Path Coefficient

Hypothesis	Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics	P Values	Decision
H1	Attitude -> Intention	0.271	0.274	0.059	4.609	0.00	Accept
H2	Subjective Norm -> Intention	0.248	0.249	0.056	4.454	0.00	Accept
H3	Behaviour Control -> Intention	0.453	0.449	0.063	7.18	0.00	Accept
H4	Behaviour Control -> Behaviour	0.24	0.24	0.062	3.847	0.00	Accept
H5	Intention -> Behaviour	0.34	0.339	0.06	5.648	0.00	Accept
H6	Technology _Usage -> Behaviour	0.367	0.366	0.056	6.588	0.00	Accept
H6	Moderating Effect 1 -> Behaviour	-0.145	-0.149	0.062	2.339	0.02	Accept
H7	Moderating Effect 2 -> Behaviour	0.157	0.16	0.074	2.122	0.03	Accept

These moderating effects suggest that depending on the degree of technological adoption, the influence of certain variables on behavior may change (38). The results indicate that technology use, attitude, behavior control, intention, and subjective norm are significant elements impacting the behavior of Gen-X SHG women entrepreneurs.

R Square Prediction

Table 7 presents findings from a behavior model of Gen-X SHG women entrepreneurs, with technology adoption as a moderating factor. The R² values

indicate the model's predictive accuracy, ranging from 0 to 1, where 1 signifies perfect prediction (46). As per general guidelines, R2 values of 0.75, 0.50, and 0.25 denote substantial, moderate, and poor predictive accuracy, respectively (46, 50). The basic model predicts intention and behavior with an R2 of 0.787, indicating high accuracy. The behavior variable shows an R² of 0.741 in the base model, improving to 0.788, also indicating high accuracy (49). These results affirm significant predictive accuracy in both the moderation and

base models for Gen-X SHG women entrepreneurs' behavior. Based on Table-8 the SRMR (Standardised Root Mean Residual) values, the analysis summary indicates that both the base model and the moderation model display (0.053)

excellent fit. The results of this study are consistent with other studies (35, 49, 51), which highlights the significance of considering SRMR as a trustworthy indication of model fit.

Table 7: R Square Prediction

Model	Endogenous Variable	R ² Value	Decision
Base model FIT	Intention	0.787	Substantial
	Behavior	0.741	Moderate
Moderation Model Fit	Intention	0.787	Substantial
	Behavior	0.788	Substantial

Table-8: Model Fit

Fit Indices	Base model FIT		Moderation Model Fit	
	Saturated	Estimated	Saturated	Estimated
SRMR	0.053	0.053	0.053	0.054
d_ULS	0.539	0.541	0.721	0.735
d_G	0.305	0.306	0.460	0.468
Chi-Square	391.325	392.233	579.11	581.201
NFI	0.871	0.871	0.845	0.844

d_ULS and d_G fit indices were utilised for comparison. The d_ULS and d_G values for the basic model were 0.305 and 0.539, respectively. A better match is indicated by lower values for d_ULS and d_G. D_ULS and D_G in the moderation model have values of 0.721 and 0.46, respectively. The d_G measures the unweighted generalised least squares discrepancy, the d_ULS measures the unweighted least squares discrepancy.

The study employs chi-square statistics to compare model fits: 392.233 (basic) vs. 391.325 (saturated) for the base model, and 581.201 (estimated) vs. 579.11 (saturated) for the moderation model, indicating strong variable connections. Further investigation into other fit indices is necessary to assess overall model goodness. NFI values of 0.871 (base) and 0.845 (moderation) suggest good fit, reinforcing model validity.

The analysis shows that the base model and moderation model show excellent fit (51). The relatively low values of d_ULS and d_G show that both the base model and the moderation model have a respectable degree of fit. Finally, the analysis Summary is considering the validity and reliability of the model, the PLS-SEM analysis yields significant outcomes at the chosen significance level.

The findings of the analysis summarized with an emphasis on the validity and reliability, respondent demographic profile, measurement model, path model, and bootstrapping model analysis:

A total of 230 respondents from six mandals were surveyed, with Tavanampalli having the highest participation (57 respondents) and Rompicherla the lowest (22 respondents). The data collected includes three main types of enterprises: Food, Vegetables and Fruits, and Fancy and Garments. Tavanampalli showed significant engagement in Vegetables and Fruits (26 respondents).

A significant portion of participants (31.30%) lacked formal education, while others completed elementary school (20.87%) and SSC (23.48%). The majority of respondents (34.35%) earned less than Rs 20,000 annually, with another significant portion (29.13%) earning between Rs 20,001 and Rs 40,000. Most participants (39.13%) were categorized as OC (Other Castes), with smaller proportions belonging to other social groups.

The measurement model showed no collinearity issues with VIF values below 5. Factor loadings above 0.7, Cronbach's alpha values above 0.7, and high composite reliability scores confirmed the model's validity and reliability. The constructs demonstrated strong discriminant validity, with

AVE values ranging from 0.641 to 0.738, and HTMT ratios below 0.900.

Path coefficients indicated significant positive relationships between attitude and intention (0.271), behavior control and intention (0.453), intention and behavior (0.34), and technology usage and behavior (0.367).

Technology usage significantly moderated the impact of behavior control on behavior (0.24), indicating that technology adoption influences entrepreneurial behavior. The R² values indicated high predictive accuracy, with values of 0.787 for intention and 0.741-0.788 for behavior. Both the base model and the moderation model showed excellent fit, with SRMR values of 0.053 and good NFI values above 0.8. Both the base model and the moderation model demonstrated excellent fit, with SRMR values of 0.053 and acceptable NFI values above 0.8, indicating good model fit and predictive accuracy.

These points provide a comprehensive overview of the key findings from the analysis, supporting the discussion and implication summary of the study.

Discussion

The study's findings complement H1, indicating that attitudes regarding entrepreneurship have a substantial influence on GenX SHGs Women entrepreneurs. Attitudes are influenced by one's ideas about the repercussions of their actions (26). Specifically, sentiments in the entrepreneurial sphere reveal a preference for self-employment over pursuing entrepreneurship as a career (27). Members who participate in SHG training programs develop an entrepreneurial attitude, which fosters a long-term dedication to entrepreneurial efforts. This is consistent with earlier investigation demonstrating the critical impact of attitude in fostering entrepreneurial feelings (24, 52).

The study reveals the significant influence of subjective norms on entrepreneurial intention, notably among Gen-X SHGs' female entrepreneurs. Subjective norms capture the social and peer forces that heavily influence decision-making processes (30). Accept the hypothesis 2 in this investigation. Notably, recent research has shown that peer support and validation within SHGs might boost entrepreneurial goals (21, 31). These findings support previous research demonstrating the importance of subjective standards in supporting entrepreneurial initiatives (52).

Understanding these dynamics is critical for developing effective treatments and support systems to foster entrepreneurial endeavors in varied socio-cultural environments.

The study's findings highlight the importance of perceived behavioral control in molding the entrepreneurial inclinations of Gen-X SHG Women. We may accept H3 in this study's outcome. Consistent with earlier research (6, 24, 52), our findings show that perceived behavioral control has a strong favorable influence on entrepreneur intention. This shows that people's confidence in their capacity to control and execute entrepreneurial actions has a major impact on their decision to pursue entrepreneurship. Such findings emphasize the necessity of creating a supportive atmosphere that boosts people's confidence and self-efficacy in their entrepreneurial activities, particularly among GenX SHG Women.

Accepting H4, this study investigates the complex dynamics of Gen-X SHG Women's Entrepreneurial Behavior. The discussion emphasizes the importance of perceived behavioral control, which is backed by research (33), which shows favorable relationships between confidence, self-efficacy, and business success. This view promotes proactive methods, resilience, and risk-taking, all of which are necessary for entrepreneurial ability. The findings highlight the significance of perceived behavioral control. This debate sheds light on the intricate interaction of psychological elements and entrepreneurial skill, demonstrating the intricacies of human cognition in business environments (24).

The PLS SEM result investigates the complex link between entrepreneurial talents, intentions, and actions within the context of the human mind. The study, using Partial Least Squares SHGs (PLS SEM), demonstrates the positive relevance of entrepreneurial competences on entrepreneur intention (22), therefore accept the H5. This outcome is consistent with a prior research (52) that emphasized the importance of purpose in driving entrepreneurial behavior. Furthermore, the study recognizes the predictive value of entrepreneurial intention on future behaviors, emphasizing the intricate interaction between psychological elements and entrepreneurial activities (25, 46). The analysis demonstrates that perceived behavioral control significantly

influences behavioral practices among Gen-X SHG women entrepreneurs, with technology usage acting as a crucial moderating factor (29). Specifically, Hypothesis-6 confirms that the integration of technology enhances the positive impact of perceived control on entrepreneurial behavior. This suggests that higher perceived control, when coupled with effective technology adoption, leads to more robust and proactive entrepreneurial activities (53). The analysis indicates that entrepreneurial intention significantly influences behavioral practices among Gen-X SHG women entrepreneurs. Technology usage acts as a moderating factor, enhancing this relationship (11). The positive path coefficients (H7) demonstrate that higher entrepreneurial intentions, when coupled with effective technology adoption, lead to improved entrepreneurial behaviors, underscoring the critical role of technology in fostering entrepreneurial success (24, 52). This study accepts the Hypothesis-7. The study revealed no significant correlation between gender and digital wallet usage, which aligns with the global trend of increased mobile payment acceptance (11).

Entrepreneur Implications

The study underscores that improving attitudes, behavior control, and intentions among Gen-X SHG women entrepreneurs can notably shape their entrepreneurial activities. Effective integration of technology moderates these dynamics, enhancing overall entrepreneurial outcomes. Furthermore, the research highlights the pivotal role of attitudes, perceived behavioral control, and trust in influencing mobile payment adoption (29). It emphasizes that technology-specific behaviors are closely linked to usage patterns, with gender disparities in technology adoption warranting further exploration. Additionally, mobile technologies, including social media platforms like Facebook, Twitter, and Instagram, empower female entrepreneurs in business administration, resource access, and marketing strategy implementation (8, 40, 54).

Policy Implications

Policy stakeholders and practitioners should focus on cultivating supportive environments that promote positive entrepreneurial attitudes and effective technology adoption among Gen-X SHG women entrepreneurs. This approach can strengthen economic growth by leveraging the

identified competencies in Food, Vegetables and Fruits, and Fancy and Garments enterprises, especially in highly engaged areas like Tavanampalli and Gudupalli, while addressing educational and income disparities in less engaged regions such as Rompicherla. Additionally, based on the study's findings, policymakers should consider tailored interventions to enhance technology utilization among Gen-X SHG women entrepreneurs. Strategies could include targeted training programs on tech adoption, financial incentives for digital infrastructure investment, and fostering collaborative platforms for knowledge sharing on digital tools. Such initiatives would bolster entrepreneurial competencies and align with the study's insights into enhancing business performance through effective technology integration.

Managerial Implications

SHG and women empowerment groups are equipping Gen-X women with resources and capacity-building efforts to foster business establishment and expansion (55). Recognizing the value of social media, these initiatives enhance entrepreneurial operations through effective marketing, customer engagement, and feedback mechanisms (56). Entrepreneurship training bolsters digital literacy among Gen-X SHG women, boosting their confidence and business acumen in technology use. Promoting existing businesses and tech-enabled ventures on social media amplifies visibility, encourages interaction, and fosters growth among SHG women entrepreneurs (38, 56).

Societal Implications

The findings emphasize the societal advantages of their innovations, such as job generation and economic contributions. Encouraging entrepreneurship among younger generations not only fosters social growth, but also aids the community's shift to technology. Furthermore, it promotes gender equality by tackling poverty, increasing social and digital literacy, and encouraging societal involvement. The rapid evolution of information and communication technology (ICT) has profoundly reshaped the global economy, transitioning many activities from offline to online and transforming consumer lifestyles (6). This advancement has also catalyzed social empowerment through enhanced technological operations. The study's focus on

Gen-X SHG women in India limits generalizability, yet finds positive impacts of psychology and technology adoption on entrepreneurial behavior (57). The study's findings are robust within the context of X-gen SHG women entrepreneurs in the Chittoor district, Andhra Pradesh, India. However, to enhance generalizability across diverse contexts such as different countries, which ever women empowerment have developing stage or deprived stages and different industries relevant entrepreneurs, future research should consider broader sampling across various geographic locations and sectors. This approach would provide a more comprehensive understanding of how the proposed theoretical framework applies universally, ensuring the applicability of insights beyond the current study's specific demographic and industrial scope. Due to its cross-sectional nature, causal assumptions cannot be established; longitudinal studies could offer deeper insights. Moreover, focusing on limited demographic criteria may overlook other crucial factors. The study proposes multi-group analysis for tailored interventions and culture-specific or industry-focused research for policymakers' informed decisions.

Conclusion

The study employed PLS-SEM to examine competitive behavioral performance among Gen-X SHG women entrepreneurs in India. It explored the adoption of mobile payment methods and the influence of technology-savvy users, focusing on factors shaping mobile payment usage among female entrepreneurs and their consumers. Integrating technology into the TPB model elucidated behavioral patterns, highlighting technology's role in enhancing entrepreneurial practices among Gen-X women, despite their lower adoption rates. The findings underscored how technology integration enhances competitiveness by boosting stakeholder satisfaction, social inclusion, and gender equality among Gen-X SHG female entrepreneurs. Building on prior research, the study offers actionable insights for policymakers and practitioners, advocating for technology-driven empowerment strategies to enhance entrepreneurial competitiveness and consumer engagement. It recommends future research include multi-group analyses across different generations to further understand technology adoption and competence behaviors

among entrepreneurs. Transdisciplinary collaboration plays a pivotal role in enhancing our understanding of entrepreneurial behavior. To empower female entrepreneurs effectively, integrating diverse fields like psychology, technology, and business management is crucial. This approach fosters holistic strategies tailored to their needs, ensuring robust support and sustainable growth in entrepreneurial endeavors.

Abbreviations

Gen-X: Generation X

SHGs: Self Help Groups

TPB: Theory of Planned Behavior

SEM: Structure Equation Modeling

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Author Contributions

As the principal investigator, Bedaduri Ramamurthy, played a pivotal role in shaping the study path. Serving in a supervisory capacity, Dr. Rajesh Mamilla, provided invaluable guidance and oversight throughout the research process. This involved empirical investigation of competence behavior performance and mobile technology usage PLS-SEM analysis, ensuring its soundness, and validating the overall research design.

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. The authors declare no conflict of interest.

Ethics Approval

Not applicable.

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