Expectation-Reality Gap in Information Technology Discontinuance Intention

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ABSTRACT

Discontinuance intention has been reported as a major concern in context of manufacturing SMEs. This study examines why user SMEs decide to discontinue the incumbent technology. The study employed the theoretical lens of diffusion of innovation theory, disenchantment-enchantment model, and technology-organization-environment model to develop an integrated Expectation-Reality gap (E-R gap) framework. The research model was examined using data gathered through a cross-sectional survey of 300 SMEs in the Indian manufacturing industry. We found E-R gap in compatibility, technology cost, government support, and ease of use are key reasons for the post-adoption disenchantment of SMEs. Further, we found that disenchanted SMEs' discontinuance intentions are quite strong, and they are more likely to quit from adopted technology shortly. **I**nformation systems (IS) researchers can extend the E-R gap model to assess the phenomena of discontinuance intentions in other NIE contexts. Implications for research and practice are discussed.

Keywords: Expectation-Reality gap; post-adoption disenchantment; discontinuous intention; post-adoption behavior; small & medium size enterprise (SMEs)

1. INTRODUCTION

The last two decades were tumultuous for the global manufacturing sector. First, the newly industrialized economies (NIEs) joined the league of first-tier manufacturing countries. Second, the advanced economies underwent a severe recession, choking demand and pushing down the manufacturing employment rate.[1] In the changing global competitive landscape, manufacturing emerged as a vital source of competitive advantage, innovation, production growth, employment, and exports among the NIEs. To survive in the global competition, manufacturing firms in NIEs adopted generic and advanced information, communication, and processing technologies to achieve smart manufacturing, which makes production systems flexible, reconfigurable, and autonomous.[2] These technologies range from basic computer hardware, electronic data exchange, and other generic digital technologies to the most advanced manufacturing digitalization technologies such as additive manufacturing, internet of things (IoT), and industrial simulations.[3]

The journey of technology adoption and its continuous use has not been easy for small and medium enterprises (SMEs). A large number of SMEs discontinue the adopted technology only in a few years and this has been reported as one of the major concerns of the technology suppliers.[4] SMEs usually lack the organizational capabilities required to optimally utilize and produce expected outcomes from adopted technology, thus, merely the investment in technology does not help them.[5] For example, the technologies for supply chain integration may not produce desired outcomes unless the business partners and customers are ready for process integration and sharing information. Due to a lack of opportunities, strategies, and resources, SMEs are not able to convince the business partners for such an alliance.[6] Moreover, the reaction to change introduced by technology adoption is not the same in large enterprises and SMEs.[7,8] The dissonance is expected, and actual technology outcomes generate a high level of disenchantment among SMEs, which ends with a quitting or discontinuance decision. Discontinuance could lead to other negative consequences. Since negative interpersonal influences are more persuasive than positive word-of-mouth, disenchanted discontinuers may negatively influence potential and prior adopters to discontinue technologies.[9]

However, scholarly attention on technology discontinuance due to disenchantment with the incumbent technology has been limited. The predominant focus of scholarly inquires over the past two decades has been to examine the factors influencing the initial adoption of new technology by big firms.[4] For instance, studies have explored the small businesses' motives and decision-making for the adoption of e-commerce applications; digital promotion tools such as webpages, and social media platforms; electronic procurement systems; and process integration systems such as enterprise resource planning.[5,10-12] Furthermore, prior studies primarily focused on adoption phase of the technology diffusion. Barring a few

studies on the continuance intention of adopter SMEs, investigations of the post-adoption phase of industrial automation technologies in the SME context have been scant.[7,13-15]

This study answers the research question; *Why do SMEs decide to discontinue the incumbent technology?* To attain its objectives, this study employed the theoretical lenses of diffusion of innovation (DoI) theory, disenchantment-enchantment model, and technology-organization-environment model to develop an integrated framework called Expectation-Reality (E-R gap) model. The majority of prior studies using DoI examined the adoption phase of technology diffusion but not the post-adoption phase.[16,17] Studies of the post-adoption phase have largely used the expectation-confirmation theory to examine how pre-adoption expectations and post-adoption performance affect continuance intention of technology users.[18] While the expectation-confirmation theory portrays pre-adoption expectation, it is often cast as post-adoption expectation that is closer to perceived usefulness.[9] Therefore, the real gap between pre-adoption expectations and post-adoption realities cannot be effectively determined, which could be a significant driver of disenchantment in the post-adoption stage eventually resulting in discontinuance intention.[4] The E-R gap framework proposed in this study extends prior work by explaining post-adoption disenchantment due to the gap between expectations in the pre-adoption phase (i.e., expectation) and the actual experience during post-adoption phase (i.e., reality). Our proposed model was empirically tested using data obtained through a cross-sectional survey of 300 SME owners/decision makers from the Indian manufacturing industry.

2. THEORY AND HYPOTHESES

While prior studies have found that SMEs adopt the latest technologies to keep up with the competitive business environment, it is known that SMEs may not continue using the technologies in the long run.[20,21] DoI provides a solid theoretical foundation and consistent empirical evidence to explain how technology innovation moves from adoption to use, i.e., adoption to post adoption stage.[22] DoI proposes that innovation characteristics such as; compatibility, complexity, relative advantage, trialability and observability play an instrumental role in new technology adoption, which have been supported in a number of studies. However, prior investigations were primarily focused on adoption or intention to adopt although it can be extended to understand discontinuance in the post-adoption stage.[9,16,17,23]

Beyond DoI, the technology-organization-environment (TOE) framework identifies generic factors influencing technology adoption and/or its use to attain business objectives.[24] Technology characteristics refer to features of new technology such as perceived usefulness, compatibility, and complexity; organization characteristics describe different aspects such as organizational culture, and scope; and

environmental characteristics represent external factors such as regulations and support.[12,19,25] In the context of SMEs, technology factors such as ease of use and compatibility are crucial in the post-adoption context since the SME's founder/CEO could be dissatisfied if the technology is difficult to use or incompatible with existing infrastructures.[18] Since SMEs have limited ability to mobilize resources and experience scarcity of financial and human resources to learn and exploit the new technology, technology cost assumes considerable importance consistent with the resource-based view.[26,27] Further, vendor support during the post-adoption phase and support from government agencies are influential in facilitating the effective adoption and use of new technologies.[10.28]

Moreover, the expectation confirmation theory (ECT) offers explanations of why SMEs may decide to discontinue an adopted technology.[29,30] ECT proposes that the difference between users' pre-adoption expectations and post-adoption performance regulates their enchantment or satisfaction with the adopted technology.[31] If the gap between pre-adoption expectations and perceived performance increases, it will generate disenchantment (i.e., user's dissatisfaction with adopted technology). However, prior studies using ECT typically measured the gap in the pre-adoption stage only; thus, the real gap between pre-adoption expectations and post-adoption perceptions remains under-examined.[19] Therefore, this study attempts to measure gap between pre-adoption expectations and post-adoption realities (E-R gap). If perceived technology output fails to be equal to or more than the expected output, the SMEs' requirement of overall performance enhancement is not fully catered and consequently, the enterprise gains disenchanted experience.[32] Disenchantment represents accumulative feeling developed during the use of technology in terms of E-R gap, i.e., the gap between SMEs' expectation from the technology and performance of technology.[30] We consider disenchantment as a direct function of the E-R gap.[9]

Drawing on DoI, TOE, and ECT we present an integrative E-R Gap framework that captures the gap between pre-adoption expectations and post-adoption technology realities. The E-R gap in the technology benefits may generate disenchantment among SMEs which often triggers discontinuance behavior.[33] Fig. 1 depicts our model, which explains how E-R gap in relevant technology benefits and environmental factors may generate disenchantment that could ultimately lead to discontinuance.

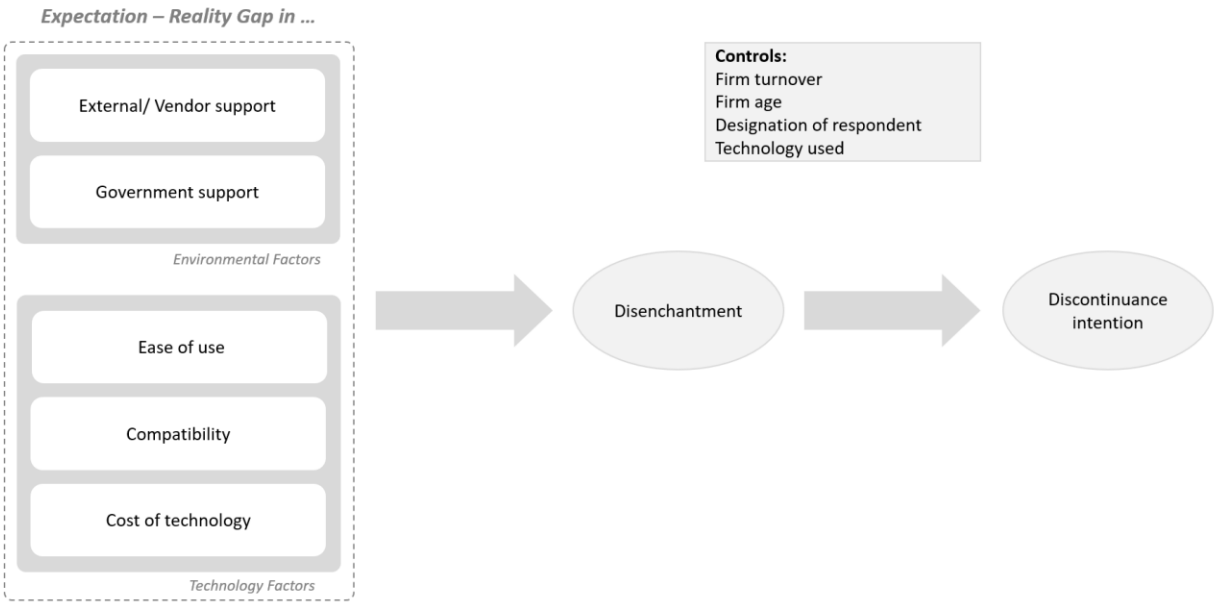


Fig. 1: Expectation-Reality gap (E-R gap) framework

2.1 Environmental factors

2.2.1 Vendor support: SMEs typically lack internal technology expertise, and therefore, they hire external consultants and vendors to develop technology solutions for their consumption. Expected assistance and service quality provided by technology vendors are some of the key drives of technology adoption in SMEs.[34] Vendor support during and after implementation are considered crucial for the success of technology projects in SMEs as they compensate for the lack of internal technology expertise.[10] Due to overdependence on external support, SMEs face difficulties as vendors develop most of the technology solutions for large firms and often do not understand SMEs' unique requirements.[35] In such cases, vendor support in customizing the solutions for SMEs and training their staff assumes considerable importance. Inadequate or non-existent vendor support is recognized as one of the primary reasons for the disenchantment among SMEs.[36] Thus, within the SME context, the E-R gap in vendor support may be a significant factor in disenchantment with adopted technology.

H1: *E-R gap in vendor-support increases the post-adoption disenchantment of SMEs*

2.2.2 Government support: Government policies and initiatives are important in stimulating the technology infrastructure and information provision to facilitate faster technology diffusion.[10] Due to the limitation of resources and small size, SMEs depend on government support more than large enterprises.[28] In developing countries, government support in the forms of information about technology adoption and utilization, financial support and incentives, and employee training offered by government agencies have proven to be

highly effective in initial technology adoption and subsequent continuance.[37] Government can assist SMEs in smooth technology adoption and utilization by increasing public spending on technology projects, governmental incentive programs, and required infrastructure. However, government support increases enchantment only if the government offers what SMEs require; otherwise, it becomes a significant reason for disenchantment among SMEs.[28] Government support generally favors SMEs' technology adoption.[5] Owing to its crucial role in technology adoption, the perceived E-R gap in government support during the post-adoption phase may generate disenchantment among SMEs.

H2: *E-R gap in government support of technology increases the post-adoption disenchantment of SMEs.*

2.2 Technology factors

2.2.1 Ease of use*:* Ease of use describes the degree to which the users believe that technology/system usage would require less or no effort.[38] The role of ease of use in shaping behavioral intentions and elevating user satisfaction (enchantment) has been extensively supported.[39] Users' behavioral intention strongly depends on their beliefs that using the technology would be easy and free of effort.[18] If the technology is easy to use, then users are encouraged to explore its features and ultimately decide to adopt and continue using it.[39] Ease of use is critical for SMEs which are usually short of money and resources. SME decision-makers may encourage their workforces to explore and optimally utilize easy-to-use technologies without employee training costs. Thus, ease of use will elevate the satisfaction level of SME decision-makers consistent with the notion that beliefs influence satisfaction.[40] Ease of use is generally considered a strong influencer of initial adoption decisions made by SMEs.[41] While using the technology, if the user SME finds that it is not that easy to use as expected, it will generate a higher level of post-adoption disenchantment.

H3: *E-R gap in technology ease of use increases the post-adoption disenchantment of SMEs*

2.2.2 Compatibility: Compatibility refers to the degree of ease in integrating new technology with the existing infrastructure, work culture, and practices of the firm.[23] Several studies found that compatibility of the new technology with the prevailing system is a crucial factor that determines the behavioral intentions of SMEs at the time of initial adoption. Incompatibility of the new technology with the existing infrastructure is a reason why many firms fail to optimally utilize the potential of new technology.[42] Consequently, disenchantment with the adopted technology is elevated. SME decision-makers evaluate the most appropriate technology that would be aligned with prior experience, current needs, culture, and infrastructure, indicating that compatibility significantly influences initial adoption decisions by SMEs.[41] During the post-adoption period then, if the technology is not perceived to be as compatible as it was expected to be at the time of adoption, then adopter SME will be disenchanted.

H4: *E-R gap in technology compatibility increases the post-adoption disenchantment of SMEs.*

2.2.3 Technology cost: Technology cost includes the operational, maintenance, and training cost of technology.[14] While making adoption decisions, it is important for CEOs of SMEs to duly consider the technology cost as they struggle with limited financial resources.[26] The high cost of technology is considered a primary reason for discontinuing the technology. Due to the shortage of money, SMEs are not able to make adequate investment in technology during adoption phase. The deficient technology investment may not render anticipated results for SMEs. For example, Hashim et al.[43] found that majority of Malaysian SMEs were not able to optimally utilize e-commerce applications because of the high running cost of e-commerce. Moreover, technology may become an asset sinkhole due to counter-productiveness.[26] Thus, in the absence of adequate financial resources to meet costs, technology investments may fail to stand up to the expectations of the SMEs' CEO, leading to a higher level of dissatisfaction. Thus, the E-R gap in technology cost impacts the disenchantment with technology during the post-adoption phase.

H5: *E-R gap in technology cost increases the post-adoption disenchantment of SMEs*

2.3 Disenchantment and discontinuance

Disenchantment is one of the primary reasons for discontinuance.[8] In utilitarian contexts, disenchantment discontinuance usually happens due to dissatisfaction with the technology itself or its features such as ease of use and compatibility. Additionally, dissatisfaction generated by the E-R gap in factors such as government support and vendor support that influenced initial adoption of technology may promote discontinuance intentions of user SMEs.[44] Disenchantment discontinuance can be explained by the "acceptance-discontinuance anomaly," which states that initial acceptance of technology goes through the E-R stage and disenchantment due to a larger gap between expectations and reality will lead to discontinuance decisions.[45] Discontinuance intention and disenchantment are not the same concepts as one's intentions are built on the perception that there will be an acceptable gap between expectation and actual experience.[46] The acceptable E-R gap keeps the user enchanted and discontinuance intentions are inhibited. However, when the acceptable gap becomes larger, it may generate disenchantment, which promotes discontinuance intentions leading to disenchanted discontinuance.[47] User enchantment (satisfaction) directly influences continuance intention to use and indirectly discourages discontinuance intention.[48] While it will be useful to investigate the direct role of disenchantment on SME owners' or decision-makers' discontinuance intention, limited attempts were made to examine the direct impact of disenchantment on post-adoption behavior. In the context of SMEs, this association is even more critical because of limited financial resources and unreasonably higher initial expectations about the adopted technology. The convergence of the two may create a big gap between general goals set and actual outcomes that are realized leading to higher disenchantment. Thus, the tolerance zone of the E-R gap of SMEs will

be much narrower than the larger firms. A larger E-R gap will elevate SME owners' post-adoption disenchantment, which promotes discontinuance intention.[8]

H6: *Post-adoption disenchantment directly affects discontinuance intention of SMEs.*

3. METHODS

3.1 Research context

The target population for this study was SMEs within the Indian manufacturing sector. The manufacturing sector is chosen considering its contribution to the overall manufacturing output and its leadership in technology adoption among SME sectors**.** According to the Ministry of Micro, Small, and Medium Enterprises (MoMSME), the micro enterprise has an annual turnover of below Indian Rupees (INR) 5 crores, the small enterprise has below INR 50 crores, and the medium enterprise has below INR 50 crore as annual turnover. In 2020, there were approximately 537,677 registered manufacturing micro small and medium enterprises (MSMEs) in India which accounted for 31% of the total MSMEs. We excluded micro enterprises considering the low scale of adoption of technology by manufacturing enterprises in this category.

We selected India as the study context as it shared many common characteristics with other emerging economies in the Asia Pacific region. In terms of socioeconomic classification, India represents an NIE or middle-income country due to its ongoing industrialization, rapid economic growth, and established government structure. According to a report of the Ministry of Statistics & Programme Implementation, the Index of Industrial Production (IIP) stood at 135.9 in December 2020 and the exports stood at US$ 200.80 billion between April 2020 and December 2020.[49] During 2018-19, the MSME sector contributed 30.27% to the country's GDP, 48% to the exports, and offered employment to over 80 million.[50] The contribution is especially high for the manufacturing sector.

Moreover, India has a supportive environment for the technological development of manufacturing SMEs. For instance, as part of the Digital India initiative, the Government of India (GoI) established a dedicated Centre of Excellence for training SMEs in emerging technologies including virtual reality, internet of things (IoT), and Blockchain technology. To strengthen internet connectivity for SMEs operating in the rural areas, the GoI invests heavily in digital infrastructure projects such as Bharat Net Project, Project Loon, and Whitespace alongside telecom companies. Further, the government offers low-interest loans for promoting the adoption of ICTs among SMEs.[51]

3.2 Survey instrument

The survey instrument was designed to include multiple sections and measurement items established in prior literature. The first two sections gathered information about the respondents and their firms as well as the level of technology adoption. The next two sections dealt with E-R gaps and discontinuance. Specifically, 5-point Likert-scale items were used to gather data on perceived E-R gaps in vendor support, government support, ease-of-use, compatibility, and technology cost and post-adoption disenchantment and discontinuance intention of users.[9,10,23,48] Firm characteristics such as size (annual turnover), age (years of registration), designation of respondent, and technology used were used as control variables.[52]

Owners of two manufacturing SMEs and three academics were invited to review the refined instrument as part of pilot test. They were also invited to evaluate the readability of the questionnaire items. Discussions were conducted to make sure there was no ambiguity in understanding the items and to receive their suggestions for amendments. This pilot test led to the recognition of a few ambiguities in the items resulting in the revised survey questionnaire for conducting the main study. The final instrument is shown in the Appendix.

3.3 Data collection

We adopted a purposive sampling method to identify manufacturing SMEs which exhibited the typical, routine, and normal technology adoption behaviour. This method allows reaching the target population faster than a random sampling method. A list of registered SMEs was obtained from the website of the MoMSME (https://msme.gov.in/), an executive body of the GoI, and the same was given to the data collection agency. As of May 2021, there were 989,452 SMEs registered under the manufacturing category.[53] This category is composed of 24 subcategories according to the National Industrial Classification with textile, food, and fabricated metal manufacturing as the top subcategories. Based on the list, the data collection agency acquired the information on manufacturing SMEs located in the North region. Concurrently, the agency applied offline and online searches for manufacturing SMEs in local vicinities and established personal contact via telephone or word of mouth.

The unit of analysis is the individual SME owners or decision-makers. Based on the willingness of the SME owner to participate expressed over telephone conservations, personal visits of one of the agency team members were arranged to the participants' premises. The purpose of these visits was to explain the purpose of the study to the SME owner to gain participation and to obtain an understanding of the enterprise business. A hard copy of the survey along with a prepaid cover was also delivered to the participating SME owners/managers. Out of the 750 surveys administered from selected SMEs over three months between February 2021 to April 2021, 375 surveys were returned. After the data cleaning process which involved removing missing values, a final sample size of 300 completed surveys was achieved, resulting in a response

rate of 40% which is acceptable in social science research.[54] Table 1 shows the demographic profile of the sample. Survey responses were examined using SPSS and AMOS software.

Table 1: Demographics of sample

Respondent & enterprise characteristics		N	%
Respondent's Role	CEO / Owner	237	79
	Other Senior Managers	63	21
Respondent's Gender	Male	175	58.3
	Female	125	41.7
Sector	Electronic & electrical parts	34	11.3
	Fabricated Metal	55	18.3
	Construction products	21	7
	Textile & apparel	21	7
	Agriculture products	24	8
	Food & Beverage	34	11.3
	Chemical	19	6.3
	Wood/paper products	16	5.3
	Rubber	11	3.6
	Automotive components	48	16
	Oil & related products	17	5.9
Annual turnover	Between INR* 5 Crore and less than 25 Crore	254	84.7
	Between INR 25 Crore and less than 50 Crore	35	11.7
	Between INR 50 Crore and less than 150 Crore	10	3.6
	Between INR 150 Crore and less than 250 Crore	1	0.3
Age (years of registration)	Less than 5 years	17	6
	5-10 years	48	16
	10-20 years	81	27
	More than 20 years	154	51
Technology(ies) used in manufacturing	Robotics & Automation	112	37.3
	Others	188	62.7

***INR=0.014US$**

3.4 Data analysis

For testing the hypothesized framework, we adopted a survey-based research design.[54] First, for the assessment of sampling bias due to non-response, we adopted the extrapolation method of comparing responses from earlier and later responses.[55] We defined the later respondents as those who responded past the target completion date and early respondents as those who answered in the first three weeks. The results of chi-square test show no statistically significant difference between the two respondent categories ($p>0.05$) suggesting the absence of non-response bias.

Since a single respondent (SME owner/manager) completed the survey, common method variance (CMV) might introduce systematic errors. To avoid CMV, a few measures suggested by were undertaken.[56] The items dealing with independent and dependent variables were situated far from each other on the questionnaire. To avoid respondent bias, a clear statement about the anonymous nature of the study was added to the survey instrument. The Harman's single-factor test was conducted using all the study variables.

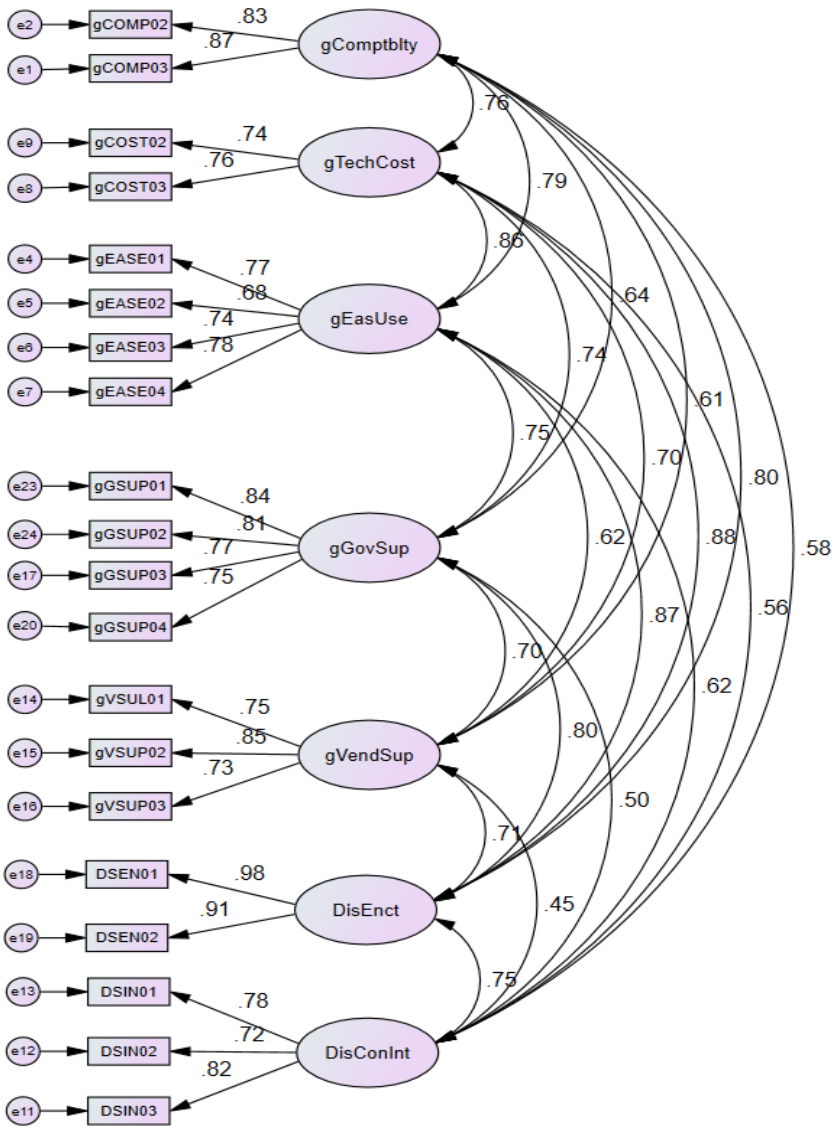
The results indicated that the single factor accounted for 24% of the total variance, thereby suggesting that no single factor described the variance in the proposed model.

Construct reliability was evaluated using Cronbach α. For validating the measurement model, confirmatory factor analysis (CFA) was conducted in AMOS 25. Structural equation modeling (SEM) techniques were applied to test the hypothesized relationships.[57]

4. RESULTS AND DISCUSSION

4.1 Construct reliability and validity

Figure 2 shows the results of the CFA for the measurement model and the fit indices. We assessed fit indices such as normed chi-square (χ^2/d.f.), root means a square error of approximation (RMSEA), root means square residual (RMR), the goodness of fit (GFI), comparative fit index (CFI), and Tucker-Lewis coefficient index (TLI).[58]



Fit Indices: χ^2 = 318.853*; df* = 181*;* χ^2/df = 1.762*; CFI* = 0.967*; GFI*= 0.914*; TLI* = 0.958*; RMSEA* = 0.062*; RMR* = 0.038

**Labels: DisconInt: discontinuance intentions; DisEnct: disenchantment; gComptblty: E-R gap in compatibility; gTechCost: E-R gap in Technology cost; gEasUse: E-R gap in ease-to-use; gGovSup: E-R gap in government support; gVendSup: E-R gap in vendor support*

Figure 2: Measurement model

Table 2 shows that all composite reliability (CR) values are over 0.80 and all AVE values are over 0.55.[57] Also, the λ^2 value of all the pairs was found to be smaller than the AVE of each construct. This provided evidence of the convergent validity of the measures. Further, Cronbach's $\alpha > 0.5$ indicated the internal consistency of the constructs.

Table 2: CFA results

	CR	AVE	DisconInt	gComptblty	gTechCost	gEasUse	gGovSup	gVendSup	DisEnct
DisconInt	0.82	0.60	**0.77**						
gComptblty	0.84	0.72	0.58	**0.85**					
gTechCost	0.72	0.57	0.56	0.76	**0.75**				
gEasUse	0.83	0.55	0.62	0.78	0.66	**0.74**			
gGovSup	0.87	0.63	0.50	0.64	0.74	0.75	**0.79**		
gVendSup	0.82	0.60	0.46	0.61	0.70	0.62	0.70	**0.78**	
DisEnct	0.94	0.89	0.75	0.46	0.48	0.67	0.30	0.21	**0.94**

Cronbach α is given on the diagonal in bold.
Composite reliability (CR) and Discriminant validity or Average variance extracted are presented in separate columns.

4.2 SEM results

SEM analysis was used to examine the hypotheses proposed in the model (Fig. 1). First, we evaluated the fit of the hypothesized model. The model fit indices are: χ^2/df = 1.639; CFI = 0.961; GFI= 0.903; TLI = 0.955; RMSEA = 0.046; RMR = 0.038, which demonstrates good fit.[58] Then, we tested the structural relationships using SEM analysis. Table 3 shows the results for hypothesized relationships. The structural links from E-R gap in compatibility (ß= 0.19**), technology cost (ß= 0.338**), ease of use (ß= 0.210**), and government support (ß= 0.215***) to post-adoption disenchantment was found to be positively significant. However, the impact of E-R gap in vendor support (ß= 0.069) was weak and insignificant, resulting in the rejection of H_1. Thus, the results supported hypotheses H_2, H_3, H_4, H_5. Further, among the control variables, respondent designation and technology adopted were found to be significant, however, firm annual turnover and firm age were found to have an insignificant influence.

Prior studies found vendor support to be an essential dimension of technology adoption by SMEs.[10] Interestingly, during the post-adoption period, this factor does not seem to be that critical as we found that the E-R gap in vendor support was not a significant cause for post-adoption disenchantment of SMEs. In the NIE context, the technical capabilities of local vendors are comparatively low and therefore, the SMEs' expectations from them are not very high. Consequently, the E-R gap experienced during the post-adoption period does not exceed the acceptable range and hence disenchantment does not arise.

Our results show that the E-R gap in compatibility, technology cost, government support, and ease of use are key reasons for the post-adoption disenchantment of SMEs. Given the resource limitations of SMEs, the expectation characteristics such as perceived compatibility, perceived ease of use, and estimated technology cost become the key considerations for the satisfaction of SMEs during the post-adoption period. To control the overall investment in technology adoption, SMEs prefer to adopt the new technology that is well-aligned with the existing systems and infrastructure and easy to use without much effort and employee training. Moreover, SMEs adopt the new technology too quickly with quite high expectations based on peer recommendations that may trigger problems if their business does not rapidly adapt to the

new technology environment. The larger gap in expected characteristics (compatibility, ease of use, and cost) and actual experience may increase post-adoption disenchantment. Similarly, in the NIE context, government support becomes a crucial factor for smooth technology diffusion because of underdeveloped infrastructure, and limited options for raising funds available to potential technology adopters and for post-adoption enchantment.[10,28] If the actual support by the government is found to be less than expected, SMEs may be constrained to disenchanted discontinuance of technology. These results however should be used and generalized carefully. Due to their peculiar characteristics, the factors influencing the technology adoption and post-adoption behavior of users from NIE may be different from developed countries.

The results show a strong and positive significant impact (ß= 0.729***) for the relationship between post-adoption disenchantment on discontinuance intention of SMEs, thereby supporting H_6. This implies that disenchanted SMEs' discontinuance intentions are quite strong, and they are more likely to quit from adopted technology shortly. The association of post-adoption disenchantment and discontinuance intention can be explained by the rational choice theory which is widely employed in explaining the decision-making process in organizations.[59] Decision-makers (SME owners) typically conduct a cost-benefit analysis before making a decision. During the post-decision period, the E-R gap in cost and benefits determines the satisfaction levels the technology will generate for the decision-maker.[4] The innovation/technology acceptance studies on SMEs generally focus on key determinants of adoption. However, it should be noted that adopting a new technology is a transformational process that needs considerable effort for switching from existing systems to newer ones with set expectations of perceived benefits. The real challenge is encountered when SMEs are not able to achieve the expected characteristics of adopted technology and experience the E-R gap. The disenchantment generated by the difference in the expected and actual experience of technology accelerates discontinuance intentions.

Table 3: Results of Hypothesis testing

Hyp.	Relationship	Regression test				Result
		R^2	β	S.E	t-value	
H_1	E-R gap in vendor-support increases the post-adoption disenchantment of SMEs	0.851	0.068^{ns}	0.089	1.140	Not supported
H_2	E-R gap in government support of technology increases the post-adoption disenchantment of SMEs.	0.851	0.212***	0.067	3.369	**Supported**
H_3	E-R gap in technology ease of use increases the post-adoption disenchantment of SMEs	0.851	0.213*	0.151	1.850	**Supported**
H_4	E-R gap in technology compatibility increases the post-adoption disenchantment of SMEs.	0.851	0.197**	0.097	3.008	**Supported**
H_5	E-R gap in technology cost increases the post-adoption disenchantment of SMEs	0.851	0.336**	0.188	2.544	**Supported**
H_6	Post-adoption disenchantment directly affects discontinuance intention of SMEs.	0.553	0.740***	0.044	11.535	**Supported**
Controls						
	Designation → Discontinuance intention	0.553	-0.083*	0.076	-1.726	
	Firm age → Discontinuance intention	0.553	0.047^{ns}	0.034	0.981	
	Turnover → Discontinuance intention	0.553	-0.015^{ns}	0.085	-0.307	
	Technology used → Discontinuance intention	0.553	-0.109**	0.064	-2.274	

5. CONCLUSION AND IMPLICATIONS

The aim of this study was to explain the discontinuance behavior among technology users in the manufacturing SME sector in NIEs such as India. To that end, we analyzed the effect of the E-R gaps in technological and environmental factors that result in post-adoption disenchantment leading to discontinuance intention. At a collective level for SMEs of all sizes and ages, our results showed that the primary cause of discontinuance intention is the post-adoption disenchantment generated by the high E-R gap in government support, ease of use, compatibility, and technology cost. Among these factors, the E-R gap in technology, cost, government support and ease of use were the main reasons for post-adoption disenchantment that led to discontinuance of the incumbent technology. It implies that unreasonably high pre-adoption expectations of SMEs pertaining to overall technology cost, support from government, efforts required to optimally utilize the technology, and compatibility of incumbent technology with existing systems and processes may generate high levels of disenchantment, that may ultimately foster discontinuance intentions.

5.1 Implications

The findings of this study entail several implications for technology suppliers, marketers, and policymakers. Our study revealed that the primary reasons for disenchanted discontinuance are E-R gaps in ease of use, compatibility, technology cost, and government support. The scarcity of financial resources and skilled workforce in SMEs explains the crucial role played by these E-R gaps. To minimize the E-R

gaps during the post-adoption period, the information about technology ease of use by the current workforce with existing skillsets, government support in the forms of information about technology adoption and utilization, financial support, and incentives, and the total technology cost to the firm including running and maintenance cost should be clearly and accurately conveyed. Clear and well-crafted marketing communication may reduce required marketing efforts at subsequent stages.

At the introduction stage, the marketing efforts directed towards early technology adopters should be carefully designed and executed to set the right level of expectations in terms of ease of use, technology cost, compatibility, and government support. If the expectations during pre-adoption phase are so high that the technology supplier is unable to deliver during the consumption phase, a gap will be created between expected and actual deliverables from the technology and environment. These unmet expectations are the main reason for higher level of post-adoption disenchantment of adopter SMEs who may decide to discontinue using the adopted technology. The managerial focus should be on the question of how to inhibit the discontinuance intention of early adopters as it could have a multiplying adverse effect on the supplier industry. Marketers should remember that early adopters' expectations from the technology product are set by the information spread through marketing and promotion efforts while the later adopters' expectations are primarily defined by the experience and feedback of prior adopters.[23] Therefore, disenchanted discontinuer SMEs should be a big concern for the marketers and technology suppliers because their negative word of mouth about the incumbent technology will have significant adverse impacts on subsequent adopters. Owing to the resource constraints and limited risk-taking capacities of SMEs, the impact of disenchanted adopters' discontinuance will have a serious impact on the adoption decisions of potential late adopters.

Marketers have to be mindful of the higher vulnerability of subsequent adopters towards negative publicity done by disenchanted adopters pertaining to E-R gaps in the above-mentioned factors. Moreover, at the growth and maturity stage of the innovated technology, such negative publicity may seriously undermine the marketing and promotion efforts of suppliers to attract new adopters and retain the existing ones. Thus, disenchanted discontinuer SMEs may significantly contribute to the level of churn in the industry. On the other hand, the late adopters' tendency to have unrealistic expectations might result in disenchantment with new technology and further discontinuance.[9] Therefore, the E-R gap in relevant technology facilitators has to be appropriately managed by the suppliers and marketers.

Further, our results drew the attention of policymakers towards a key environmental factor, i.e., government support, for SMEs during post-adoption period. The E-R gaps in government support may create a high level of post-adoption disenchantment among SMEs. Training programs and financial assistance in the form of tax relaxations and loans at affordable interest rates by the government facilitate the technology diffusion in SMEs.[28] When adopting the technology, SMEs will rely on the commitments

made by government to help them overcome the above-mentioned hurdles. The post-adoption disenchantment due to the difference in expected support and actual support will shake the confidence of SMEs in government policies and support systems, which could have long-term impacts on subsequent diffusion of new technologies. Therefore, to convert them into regular users of technology, policymakers may extend adequate support and prepare an environment of trust for SMEs by reducing the E-R gaps in government support during post-adoption period.

This study offers an illustration of IS post-adoption behavior research in an NIE context for researchers. Information systems researchers can gain from the E-R gap model proposed in this study to assess the phenomena of discontinuance intentions in other NIE contexts. Additionally, there are implications for the Indian manufacturing SME sector, a major contributor to the country's industrial output. Studies on technology commitment and discontinuance intentions for the Indian manufacturing sector are scarce. This study is therefore a founding effort in that direction.

5.2 Limitations

This study has certain limitations that future research might address. First, the use of manufacturing SMEs as the study context limits the ability to generalize the findings outside the manufacturing sector. Hence, future studies should attempt to include service SMEs in NIEs using information, communication, and processing technologies. Second, the study focused on India, an exemplar NIE of Asia. However, the research model may be applicable across NIEs in other regions such as Africa. Similar research in other Asian NIEs (e.g., Thailand & Malaysia) would be useful to provide a unique aspect to post-adoption technology behavior research. Such investigations would allow the assessment of similarities and differences among manufacturing SMEs in different regions of Asia. Third, though this study envisages the effects of E-R gap in environmental and technological factors influencing discontinuance intentions, it did not infer a causal relationship among these factors. Therefore, future research should examine causal relationships among these E-R gap factors. Finally, other factors may impact discontinuance intentions in NIEs that were not explicitly included in this study. For instance, the E-R gap in trust between SMEs and their trading partners (which may be large enterprises) has not been considered. Future studies evaluating the effects of these considerations would therefore supplement and enhance the findings of this study.

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APPENDIX: Survey Instrument

Section A: Demographics

Name of the Business Firm	
Name of the Respondent	

Designation and Role						
Gender of the Respondent		Male		Female		Prefer not to say
Product/Product lines manufactured by the Business Firm						
The average annual turnover of last three years (2016-17, 2017-18 & 2018-2019)	i)	Between 5 Crore and less than 25 Crore				
	ii)	Between 25 Crore and less than 50 Crore				
	iii)	Between 50 Crore and less than 150 Crore				
	iv)	Between 150 Crore and less than 250 Crore				
What is the number of years since your business firm was established/ registered?	i)	Less than 5 years				
	ii)	5-10 years				
	iii)	10-20 years				
	iv)	More than 20 years				

Section B: Technology adoption behavior

Which of the following Technology(ies) is/are used to produce goods in your manufacturing unit)	i)	Robotics & Automation Computer-aided design & other design software production scheduling
	ii)	Others (such as Additive manufacturing, Sensors & Programmable Logic Controllers, Computer-aided design & other design software production scheduling, electronic data interchange/ electronic fund transfer systems etc.)

Section C: Expectation-Reality gap in driving factors

S. No	Item	Strongly Disagree	Disagree	Neutral/ No Opinion	Agree	Strongly Agree
1.	Using technology is as compatible with our existing processes as we expected					
2.	Using the technology fits as well with the way we like to work as we expected					
3.	Using the technology fits into our work style as we expected					
4.	As expected, the overall costs of technology are NOT greater than its benefits					
5.	As expected, the cost of operation, maintenance and support of technology are NOT high for our business					
6.	As expected, the amount of money and time invested in training employees to use this technology are NOT very high					
7.	Learning to use technology is as easy as we expected					
8.	Using technology is not cumbersome exactly as we expected.					
9.	We find technology as easy to use as we expected					
10.	We find it easy to get the technology to do what we expected.					
11.	As expected, our technology vendor/supplier provided adequate technical support during technology implementation.					
12.	As expected, our vendor/supplier provided sufficient post-implementation technical support.					
13.	As expected, our vendor provided adequate training to our employees to use technology					
14.	As expected, SMEs adopting technology received adequate financial support from the State/Central government					

S. No	Item	Strongly Disagree	Disagree	Neutral/ No Opinion	Agree	Strongly Agree
15.	As expected, the relevant policies introduced by the State/Central government to boost technology adoption by the Indian SMEs are effective					
16.	As expected, the State/Central government provided training workshops to boost technology adoption by the Indian SMEs					
17.	As expected, the State/Central government helped in obtaining cost-effective consultation to boost technology adoption by the Indian SMEs.					

Section D: Disenchantment and Discontinuance Intention of Users

S. No	Item	Strongly Disagree	Disagree	Neutral/ No Opinion	Agree	Strongly Agree
1.	I am dissatisfied with the current technology in use, and have started looking for another one					
2.	I am dissatisfied with the current technology, but have not yet started to look for another one					
3.	We intend to discontinue using the current technology					
4.	Continue use of the current technology is NOT a good idea					
5.	We are going to discontinue using the technology and returning to the old methods					