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Perceived Risk and Women's Reluctance Toward Early Breast Cancer Screening: Evidence from a sample in Tiaret Province

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Abstract :
Early breast cancer screening is essential for improving treatment outcomes, yet many women still delay or avoid it. This study examines screening as a preventive health service and analyzes how perceived risk affects women's attitudes and reluctance toward screening. Perceived risk was modeled as a higher-order construct including functional, financial, physical, psychological, social, and time risks, while attitudes were represented through cognitive, affective, and conative dimensions. Using survey data from 100 women in the Wilaya of Tiaret, Algeria, and PLS-SEM analysis, the results show that perceived risk weakens favorable attitudes and directly increases reluctance, whereas positive attitudes reduce reluctance. The mediating role of attitudes was not supported. Psychological risk emerged as the most influential dimension. The findings suggest that reluctance is shaped not only by fear of the disease, but also by concerns about the anticipated screening experience.
Keywords: perceived risk; breast cancer screening; preventive health services; attitudes; reluctance; Algeria
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Introduction:
Breast cancer remains one of the most serious health challenges affecting women worldwide, and early screening is widely recognized as a key strategy for reducing mortality and improving treatment outcomes. However, despite the medical value of early detection and the availability of screening services, many women still hesitate, postpone, or avoid screening. This gap indicates that screening behavior is shaped not only by awareness of the disease, but also by how women perceive the screening experience itself.

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From a consumer behavior and services marketing perspective, early breast cancer screening can be understood as a preventive health service whose acceptance depends on perceived benefits, anticipated discomfort, uncertainty, and emotional responses. In this sense, screening reluctance may reflect concerns about the service experience rather than the disease alone. Perceived risk is therefore a useful framework for explaining why women may develop unfavorable attitudes toward screening and ultimately avoid it.

In Algeria, breast cancer is the most frequently diagnosed cancer among women, and delayed detection remains a persistent concern despite prevention efforts. This context highlights the need to better understand the behavioral factors that discourage participation in early screening. Against this background, the present study examines the effect of perceived risk on women's reluctance to undergo early breast cancer screening, while also assessing the role of attitudes toward screening. By doing so, the study contributes to extending perceived risk theory to preventive health services and offers practical insight into how screening uptake can be improved.

1. Literature Review and Hypothesis Development

1.1. Breast cancer screening as a preventive health service

Breast cancer screening is widely recognized as a public health priority because early detection improves treatment options and survival outcomes (Marmot et al., 2013; Ginsburg et al., 2017). Yet, from a behavioral and services-marketing perspective, screening is not only a medical recommendation but also a preventive health service that women evaluate before accepting or avoiding it. This is important because reluctance does not always result from lack of awareness; it may also reflect expectations that the service will be stressful, intrusive, painful, or inconvenient.

Like many services, screening is intangible before use, emotionally sensitive, and difficult to evaluate in advance. Under such conditions, decisions are shaped not only by expected benefits but also by anticipated losses and discomforts (Mitchell, 1999; Stone & Grønhaug, 1993; Solomon, 2020). Recent reviews confirm that screening participation is influenced by emotional, psychological, social, and practical barriers that go beyond awareness and access (Momenimovahed et al., 2020; Amini et al., 2023; Bowser et al., 2017). This supports viewing breast cancer screening as a consumer-like evaluative choice in which women assess the desirability and burden of the service experience.

1.2. Perceived risk in preventive health service decisions

Perceived risk refers to an individual's perception that a decision may lead to undesirable consequences under conditions of uncertainty (Mitchell, 1999; Stone & Grønhaug, 1993). In marketing, it is commonly used to explain hesitation, delay, and avoidance when outcomes are difficult to predict. This logic is especially relevant in health services, where uncertainty is combined with emotional vulnerability.

In breast cancer research, risk has often been approached in relation to the disease itself, especially susceptibility, severity, and fear of diagnosis (Brewer et al., 2007; Shin et al., 2011; Vernon, 1999). While important, this view does not fully capture the service-related concerns that may shape the decision. A woman may fear not only cancer, but also the screening experience itself, including pain, embarrassment, anxiety, uncertainty, or discomfort. Earlier and more recent studies suggest that fear, embarrassment, and uncertainty can reduce screening behavior even when women

recognize its preventive value (Vernon, 1999; Abdel-Aziz et al., 2018; Azaiza et al., 2010; Charaka et al., 2019). This justifies extending perceived risk from disease-centered fear to service-centered perceived risk.

1.3. Multidimensional perceived risk in breast cancer screening

Consumer research has long shown that perceived risk is multidimensional rather than singular, because individuals often anticipate several forms of loss at the same time (Mitchell, 1999; Stone & Grønhaug, 1993). This is particularly relevant in breast cancer screening, where concerns may involve not only the examination outcome but also the process, cost, time, and social meaning of participation.

Accordingly, this study conceptualizes perceived risk through six dimensions: functional, physical, psychological, social, financial, and time risk. Functional risk reflects doubts about the usefulness or reliability of screening. Physical risk concerns anticipated pain or discomfort. Psychological risk captures anxiety, fear of bad results, and emotional strain. Social risk refers to embarrassment, modesty, stigma, or others' perceptions, especially in culturally sensitive settings (Salem & Daher-Nashif, 2020; Abdel-Aziz et al., 2018). Financial risk includes direct or indirect monetary costs, while time risk refers to scheduling difficulties, waiting, travel, and disruption of daily routines (Bowser et al., 2017; Charaka et al., 2019). Prior evidence suggests that these barriers often coexist rather than operate independently (Abdel-Aziz et al., 2018; Azaiza et al., 2010). For this reason, perceived risk is treated here as a second-order construct composed of these six dimensions.

1.4. Attitudes toward breast cancer screening

Attitude is a central determinant of behavior because it reflects an individual's overall favorable or unfavorable evaluation of performing a specific act (Ajzen, 1991). In the context of breast cancer screening, attitude expresses how women judge the examination, whether as useful, acceptable, reassuring, unpleasant, or worth undertaking. This matters because behavior is shaped not only by information but also by the meaning individuals assign to the act itself.

Consistent with behavioral literature, attitude is commonly understood through cognitive, affective, and conative components. The cognitive dimension refers to beliefs about usefulness and importance; the affective dimension concerns emotional responses such as reassurance or fear; and the conative dimension reflects readiness or predisposition toward action. This three-component view is suitable here because it captures the complexity of attitude while keeping reluctance analytically distinct as a behavioral outcome. Prior studies grounded in the Theory of Planned Behavior also support the role of attitudes in screening-related behavior (DeVellis et al., 1990; Sun et al., 2022; Mohammad nabizadeh, 2024).

1.5. Reluctance to undergo breast cancer screening

Reluctance in this study refers to a tendency to hesitate, postpone, or avoid screening despite recognizing its potential value. It does not necessarily imply outright refusal; rather, it reflects behavioral resistance shaped by emotional, cognitive, and practical burdens. This distinction is important because women may simultaneously acknowledge the importance of early detection and still resist participation when the service is anticipated as stressful or difficult.

1.6. Hypothesis development

1.6.1. Perceived risk and attitudes toward screening

Perceived risk is expected to weaken women's attitudes toward screening because anticipated negative consequences reduce the attractiveness of the service. When screening is associated with pain, embarrassment, emotional strain, wasted time, or uncertain usefulness, women are less likely to evaluate it positively. This reasoning is consistent with perceived risk theory and with research showing that fear, uncertainty, and emotional burden can undermine favorable orientations toward screening-related behaviors (Mitchell, 1999; Vernon, 1999; Zhang & Yang, 2020).

H1: Perceived risks associated with breast cancer screening negatively influence women's attitudes toward screening**.**

1.6.2. Attitudes and screening reluctance

Attitudes are expected to reduce screening reluctance because people generally show less resistance toward behaviors they evaluate positively. When women perceive screening as beneficial, acceptable, and manageable, hesitation is likely to decline. Conversely, unfavorable evaluations make reluctance more likely. This argument is consistent with the Theory of Planned Behavior and prior research linking positive attitudes to lower screening-related hesitation (Ajzen, 1991; Sun et al., 2022; Mohammad nabizadeh, 2024).

H2: Women's attitudes toward breast cancer screening services have a negative relationship with screening reluctance**.**

1.6.3. Perceived risk and screening reluctance

Perceived risk is also expected to have a direct positive effect on reluctance. Even before attitudes are fully formed, anticipated pain, fear of results, embarrassment, distrust, or inconvenience may directly discourage participation. This direct path is important because not all avoidance is necessarily transmitted through attitude. Research on fear, barriers, and avoidance in cancer-related contexts supports this view (Vrinten et al., 2019; Power et al., 2022; Smith et al., 2023).

H3: Perceived risks of breast cancer screening have a positive effect on a woman's reluctance.

1.6.4. The mediating role of attitudes

Attitudes may also mediate the relationship between perceived risk and reluctance. When anticipated losses outweigh expected benefits, women may develop a less favorable attitude toward screening, which in turn increases reluctance. This suggests that part of the effect of perceived risk may operate indirectly through women's evaluative orientation toward the screening experience.

H4: Women's attitudes toward breast cancer screening mediate the relationship between perceived risk and reluctance toward screening.

2. Methodology

2.1. Study population and sample

The empirical component of this study is based on primary data collected from women exposed, directly or indirectly, to the issue of breast cancer screening as a preventive health service. After screening the returned questionnaires, 100 valid responses were retained for analysis. Although the sample does not claim statistical representativeness of all women in the wider population, it remains analytically suitable for examining behavioral patterns related to perceived risk, attitude, and reluctance toward screening. In PLS-SEM research, the relevance of the sample lies

not only in representativeness but also in its ability to provide sufficient variance and stable estimation for the proposed model (Hair et al., 2022).

The sample profile is substantively appropriate for the topic. The respondents belong to age categories that are behaviorally relevant to preventive health decisions, and their educational, occupational, and marital characteristics provide a useful basis for interpreting their evaluations of screening. The sample is dominated by women aged 31-40 years (48%), followed by those aged 20-30 years (24%) and 41-50 years (22%), while respondents aged 51-60 years represent 6%. Educationally, the sample is relatively well educated, with 61% reporting university education and 34% postgraduate education. Most respondents are employees (64%), while 54% are married. In addition, 86% report being covered by social insurance, and 64% reside in Tiaret city center. These characteristics suggest a sample capable of understanding the questionnaire items while still reflecting meaningful diversity in lived experience.

Table 1. Demographic profile of respondents (N = 100)

Variable	Category	Frequency	Percentage
Age	**20-30 years**	24	24.0%
	31-40 years	48	48.0%
	41-50 years	22	22.0%
	51-60 years	6	6.0%
Education	**Basic education**	2	2.0%
	Secondary education	3	3.0%
	University education	61	61.0%
	Postgraduate education	34	34.0%
Occupation	**Employee**	64	64.0%
	Student	13	13.0%
	Self-employed	10	10.0%
	Without occupation	9	9.0%
	Retired	4	4.0%
Marital status	**Single**	36	36.0%
	Married	54	54.0%
	Divorced	8	8.0%
	Widowed	2	2.0%
Social insurance	**Insured**	86	86.0%

	Not insured	14	14.0%
Residence	**Tiaret city center**	64	64.0%
	Nearby municipalities	36	36.0%

Source: Author's own elaboration

2.2. Data collection instrument

Data were collected using a structured questionnaire designed to capture women's perceptions of breast cancer screening as a preventive health service. The instrument was divided into two main sections. The first section measured the core theoretical constructs of the study, while the second collected demographic information. The measurement section included 30 items distributed across the principal constructs. Perceived Risk was operationalized through six dimensions - Performance Risk, Social Risk, Physical Risk, Financial Risk, Psychological Risk, and Time Risk - with three items for each dimension, resulting in 18 items. Attitude toward screening was measured through three components - cognitive, affective, and conative - represented by 9 items. Reluctance was measured through 3 items.

This operational structure is consistent with the conceptual logic of the study. Women's reluctance toward screening is not treated as an isolated response but as the outcome of a broader evaluative process in which several perceived losses shape the overall perception of risk, which in turn influences attitude and behavioral resistance. From a service-marketing perspective, this design is especially relevant because it allows the analysis to capture screening not only as a health recommendation but also as an experience judged through anticipated emotional, physical, social, and practical costs.

Table 2. Operational structure of the questionnaire

Construct	Dimension / component	Number of items
Perceived Risk	**Performance Risk**	3
	Social Risk	3
	Physical Risk	3
	Financial Risk	3
	Psychological Risk	3
	Time Risk	3
Attitude	**Cognitive component**	3
	Affective component	3
	Conative component	3
Reluctance	**Reluctance toward screening**	3

Source: Author's own elaboration

2.3. Preliminary statistical observations

A preliminary examination of the database showed that the retained responses were complete and usable for multivariate analysis. No problematic missing-value pattern was detected, and the response structure displayed sufficient variability across the items, which supports the suitability of the data for PLS-SEM estimation. At the descriptive level, the data already suggest that respondents do not react to the issue of screening in a uniform way. Instead, they differentiate among several types of burden, which reinforces the theoretical relevance of modeling perceived risk as a multidimensional concept.

These preliminary observations are meaningful because they show that the empirical material is not flat or mechanically repetitive. Women's evaluations appear sufficiently differentiated to allow the estimation of both reflective first-order constructs and a formative higher-order construct. This point is important because a formative specification only makes sense if its dimensions contribute non-redundant information to the global construct.

2.4. Data analysis procedure

To examine the proposed conceptual model, this study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS 4. This analytical technique was considered appropriate because the study is prediction-oriented and because the model includes a hierarchical latent structure in which Perceived Risk is conceptualized as a second-order formative construct composed of six first-order dimensions. In methodological terms, PLS-SEM is particularly suitable when the objective is not only to assess the statistical significance of relationships, but also to understand how a set of latent constructs jointly explain and predict a behavioral outcome (Hair et al., 2022).

The model distinguishes between two levels of measurement. At the first level, the six dimensions of perceived risk - Performance Risk, Social Risk, Physical Risk, Financial Risk, Psychological Risk, and Time Risk - were modeled as reflective constructs. At the second level, these six dimensions jointly formed the higher-order construct Perceived Risk, which was treated as formative. Attitude and Reluctance were also modeled as reflective constructs. This specification is consistent with the conceptual argument of the article: women's overall perception of screening-related risk is not assumed to pre-exist as a single latent feeling reflected by several indicators; rather, it is understood as a broader evaluative judgment formed by several distinct types of anticipated loss. This distinction between reflective and formative logic follows the criteria emphasized by Jarvis et al. (2003) and is especially relevant in hierarchical component models (Becker et al., 2012).

Accordingly, the assessment procedure followed two complementary logics. The reflective constructs were evaluated in terms of internal consistency reliability, convergent validity, and discriminant validity. By contrast, the formative higher-order construct was assessed primarily through collinearity diagnostics and the significance and relevance of the formative contributions of its six dimensions (Hair et al., 2022). Once the adequacy of the measurement model was established, the structural model was examined through path coefficients, coefficients of determination (R^2), effect sizes (f^2), indirect effects, and predictive relevance. This sequence is consistent with standard PLS-SEM practice (Hair et al., 2022), while predictive relevance was assessed in line with the logic proposed by Shmueli et al. (2019).

2.5. Structural specification of the model

The final empirical model retained four structural relationships that directly reflect the theoretical logic of the study: Perceived Risk -> Attitude, Attitude -> Reluctance, Perceived Risk -> Reluctance, and Perceived Risk -> Attitude -> Reluctance. This structure makes it possible to examine two complementary mechanisms. On the one hand, the model tests whether women's overall perception of screening-related risk directly increases reluctance. On the other hand, it examines whether part of this influence is transmitted through women's general evaluative orientation toward screening. In this sense, the model captures both an immediate behavioral route and a more evaluative route.

3. Empirical Results

3.1. Assessment of the reflective first-order constructs

The first stage of the empirical analysis consisted of assessing the reflective first-order constructs, including the six dimensions forming Perceived Risk, as well as Attitude and Reluctance. For reflective constructs, acceptable measurement quality is generally indicated by reliability coefficients above 0.70 and average variance extracted (AVE) values above 0.50 (Hair et al., 2022). The results are reported in Table 3.

Table 3. Reliability and convergent validity of the reflective constructs

Construct	Cronbach's alpha	rho_A	Composite reliability	AVE
Performance Risk	0.737	0.744	0.851	0.657
Social Risk	0.899	0.902	0.937	0.833
Physical Risk	0.739	0.740	0.854	0.662
Financial Risk	0.877	0.877	0.924	0.803
Psychological Risk	0.904	0.905	0.940	0.839
Time Risk	0.793	0.797	0.878	0.707
Attitude	0.925	0.938	0.931	0.603
Reluctance	0.889	0.905	0.930	0.817

Source: Author's own elaboration based on SmartPLS output

The values reported in Table 3 indicate that all reflective constructs satisfy the recommended thresholds for internal consistency reliability and convergent validity. Cronbach's alpha values range from 0.737 to 0.925, while composite reliability values range from 0.851 to 0.940, all well above the conventional minimum of 0.70. Likewise, all AVE values exceed 0.50, ranging from 0.603 for Attitude to 0.839 for Psychological Risk. These results confirm that the items associated with each first-order construct converge adequately around the latent concept they are intended to capture.

This result is important not only statistically but also substantively. It suggests that the respondents' answers are not random, unstable, or weakly organized. Instead, women appear to differentiate clearly between various aspects of the screening experience. Emotional concerns cluster into a coherent Psychological Risk

dimension, bodily concerns form a distinct Physical Risk block, and practical time-related concerns remain identifiable as a separate dimension. This pattern supports the idea that breast cancer screening is not evaluated through one vague or diffuse fear, but through several structured and psychologically meaningful forms of anticipated burden.

From a marketing-oriented perspective, this is a highly relevant result. Services are rarely evaluated only in terms of objective utility. They are also judged through the anticipated experience of consuming them. The strong measurement quality of the six dimensions indicates that women evaluate screening as a service encounter with several possible costs: emotional, bodily, financial, social, performance-related, and temporal. This strengthens the article's central premise that reluctance toward screening can be better understood through a service-evaluation lens than through a purely biomedical lens.

3.2. Assessment of the second-order formative construct: Perceived Risk

Because Perceived Risk is modeled as a higher-order formative construct, its evaluation must follow criteria appropriate to formative measurement. In such cases, the central concerns are not internal consistency coefficients or AVE, but rather the absence of problematic multicollinearity among the formative dimensions and the statistical relevance of each of those dimensions to the higher-order construct (Jarvis et al., 2003; Becker et al., 2012; Hair et al., 2022).

The first step was therefore to examine collinearity among the six dimensions forming Perceived Risk. The results are reported in Table 4.

Table 4. Collinearity diagnostics for the formative dimensions of Perceived Risk

Path	VIF
Performance Risk -> Perceived Risk	1.705
Social Risk -> Perceived Risk	1.266
Physical Risk -> Perceived Risk	2.359
Financial Risk -> Perceived Risk	1.567
Psychological Risk -> Perceived Risk	1.409
Time Risk -> Perceived Risk	1.219

Source: Author's own elaboration based on SmartPLS output

All VIF values remain well below problematic levels. The highest value is observed for Physical Risk (VIF = 2.359), while the lowest is associated with Time Risk (VIF = 1.219). These results indicate that the six dimensions are related without being redundant. In other words, each dimension contributes unique information to the formation of overall perceived risk.

This point is analytically important. It means that the six dimensions do not merely rephrase the same idea in different words. Women appear to distinguish among the emotional strain of screening, its physical discomfort, its financial implications, its social consequences, its functional uncertainty, and its time burden. The dimensions are therefore complementary rather than repetitive, which supports the validity of the formative specification.

The next step consisted of examining the contribution of each dimension to the higher-order Perceived Risk construct. These results are presented in Table 5.

Table 5. Contribution of the six dimensions to Perceived Risk

Path	Beta	t value	p value
Performance Risk -> Perceived Risk	0.224	7.179	<0.001
Social Risk -> Perceived Risk	0.252	6.781	<0.001
Physical Risk -> Perceived Risk	0.279	9.662	<0.001
Financial Risk -> Perceived Risk	0.248	6.941	<0.001
Psychological Risk -> Perceived Risk	0.293	6.043	<0.001
Time Risk -> Perceived Risk	0.155	3.596	<0.001

Source: Author's own elaboration based on SmartPLS output

The results show that all six dimensions make a statistically significant positive contribution to the formation of Perceived Risk. However, their relative importance differs. Psychological Risk emerges as the strongest contributor with β = 0.293, followed by Physical Risk (β = 0.279), Social Risk (β = 0.252), Financial Risk (β = 0.248), and Performance Risk (β = 0.224). Time Risk, although significant, is the weakest contributor with β = 0.155.

This ranking is one of the most meaningful findings in the entire empirical model. It reveals that women's overall sense of screening-related risk is not driven primarily by convenience issues. If Time Risk is taken as the baseline, Psychological Risk contributes almost 89% more strongly to the formation of overall Perceived Risk, while Physical Risk contributes about 80% more strongly. Even Social Risk and Financial Risk exceed Time Risk by roughly 63% and 60%, respectively. These differences are substantial and should not be reduced to mere numerical variation.

Substantively, this means that the burden attached to screening is first and foremost emotional and bodily. Women seem to be discouraged less by the idea that screening may consume time and more by the anticipation that it may feel stressful, painful, uncomfortable, or personally heavy. In a human sense, the service appears difficult not simply because it is inconvenient, but because it is imagined as an emotionally charged encounter. In a marketing sense, this means the perceived cost of the service lies primarily in its experiential dimension rather than in its logistical dimension.

This has an important implication for the article's interpretation. If the central barriers are psychological and physical, then campaigns focusing only on access, scheduling, or organizational convenience will address only part of the problem. They may reduce peripheral friction without touching the core of women's reluctance.

3.3. Discriminant validity of the main constructs

After establishing the adequacy of the reflective and formative measurement components, the next step was to assess whether the main constructs remain empirically distinct. Discriminant validity was examined using the HTMT ratio and the Fornell-Larcker criterion. Because the higher-order Perceived Risk construct is formative, the most meaningful interpretation focuses on the three core theoretical

constructs: Perceived Risk, Attitude, and Reluctance. The HTMT criterion follows the recommendation of Henseler et al. (2015), while the Fornell-Larcker criterion remains a useful complementary check (Fornell & Larcker, 1981).
The HTMT results are presented in Table 6.

Table 6. HTMT values for the main constructs

Construct pair	HTMT
Perceived Risk - Attitude	0.304
Perceived Risk - Reluctance	0.464
Attitude - Reluctance	0.331

Source: Author's own elaboration based on SmartPLS output

All HTMT values are below conservative thresholds, indicating acceptable discriminant validity. The strongest association is observed between Perceived Risk and Reluctance (0.464), which is theoretically expected, but still sufficiently low to confirm that the two constructs are not empirically redundant. The association between Perceived Risk and Attitude (0.304) is weaker, while Attitude and Reluctance (0.331) remain clearly distinguishable.
These results are reinforced by the Fornell-Larcker criterion, reported in Table 7.

Table 7. Fornell-Larcker criterion for the main constructs

Construct	Perceived Risk	Attitude	Reluctance
Perceived Risk	0.587		
Attitude	-0.296	0.776	
Reluctance	0.430	-0.379	0.904

Source: Author's own elaboration based on SmartPLS output

The diagonal values exceed the inter-construct correlations, which supports discriminant validity. In substantive terms, these results confirm that women's global appraisal of screening-related risk is not the same as their evaluative attitude, and neither of these is identical to their reluctance to undergo the procedure. This is an important confirmation for the theoretical logic of the study. The data do not collapse everything into one general negative reaction. Instead, they support a more layered behavioral process in which women first perceive the service as risky, then evaluate it more or less favorably, and finally move toward greater or lesser reluctance.
From a marketing perspective, this distinction is crucial. A woman may recognize the service as risky and still not react in exactly the same way at the attitudinal and behavioral levels. The separation between risk appraisal, evaluative orientation, and avoidance tendency gives the model greater explanatory richness and makes the final interpretation more credible.

3.4. Structural model assessment

Once the adequacy of the measurement model was established, the structural model was examined. The first aspect considered was the model's explanatory power, expressed through the coefficients of determination (R^2). The results are reported in Table 8.

Table 8. Coefficients of determination

Endogenous construct	R^2	Adjusted R^2
Attitude	0.087	0.078
Reluctance	0.254	0.238

Source: Author's own elaboration based on SmartPLS output

The model explains 8.7% of the variance in Attitude and 25.4% of the variance in Reluctance. Put differently, the model is nearly three times more effective in explaining reluctance than in explaining attitude. The interpretation of explained variance and its substantive use in PLS-SEM follows the general guidance of Chin (1998) and Hair et al. (2022).

The relatively modest explanatory power for Attitude suggests that women's general evaluation of screening is influenced by factors beyond perceived risk alone. These may include prior experiences with healthcare services, trust in medical institutions, family or community discourse, health literacy, and broader personal beliefs. By contrast, Reluctance lies closer to the behavioral response itself and is therefore more directly shaped by the anticipated burden captured in the model.

This pattern is behaviorally plausible. People's general attitudes are often more diffuse, more socially embedded, and more dependent on background factors than their immediate resistance to a specific act. In the present case, the model is more successful at explaining why women hold back from screening than at fully capturing the entire process by which they form their evaluative orientation toward it.

The second aspect of the structural assessment concerns effect sizes (f^2), reported in Table 9.

Table 9. Effect sizes

Path	f^2
Perceived Risk -> Attitude	0.096
Perceived Risk -> Reluctance	0.149
Attitude -> Reluctance	0.093

Source: Author's own elaboration based on SmartPLS output

The three structural effects are small but meaningful. The strongest contribution is observed for the direct path from Perceived Risk to Reluctance ($f^2 = 0.149$). This effect is about 55-60% stronger than the effect of Attitude on Reluctance and also stronger than the effect of Perceived Risk on Attitude. In general, the interpretation of f^2 in small, medium, and large terms follows Cohen (1988), although here the interest lies less in labeling the effect and more in comparing the relative influence of the predictors.

These ranking matters because it shows where the model's practical force lies. Perceived Risk is not simply one antecedent among others; it is the most influential driver of women's resistance to screening within the model. In plain terms, the expected burden of the service appears to matter more for behavioral withdrawal than for evaluative judgment alone.

This result aligns well with a service-marketing reading. Consumers may sometimes withdraw from a service before developing a deeply articulated negative attitude if the anticipated experience already seems too costly, threatening, or exhausting. This appears to be the case here.

3.5. Hypothesis testing

The three direct relationships were then tested through bootstrapping. The use of bootstrapping as the standard inferential procedure in PLS-SEM follows Hair et al. (2022). The results are presented in Table 10.

Table 10. Direct effects

Hypothesis	Path	Beta	t value	p value	Decision
H1	**Perceived Risk -> Attitude**	-0.296	2.318	0.020	Supported
H2	**Attitude -> Reluctance**	-0.276	2.449	0.014	Supported
H3	**Perceived Risk -> Reluctance**	0.349	3.775	<0.001	Supported

Source: Author's own elaboration based on SmartPLS output

All three direct hypotheses are supported. The first result shows that Perceived Risk has a significant negative effect on Attitude (β = -0.296). This means that as women's overall perception of screening-related risk increases, their attitude toward screening becomes less favorable. In standardized terms, a one-unit increase in Perceived Risk is associated with a 0.296 decrease in Attitude.

The second result indicates that Attitude has a significant negative effect on Reluctance (β = -0.276). Thus, the more favorable women's attitude toward screening, the less reluctant they are to undergo the procedure. A one-unit increase in Attitude is associated with a 0.276 reduction in Reluctance.

The third result shows that Perceived Risk has a significant positive direct effect on Reluctance (β = 0.349). This is the strongest direct path in the structural model. It is roughly 18% stronger in absolute value than the path from Perceived Risk to Attitude, and about 26% stronger than the path from Attitude to Reluctance.

These comparisons are analytically useful because they clarify the behavioral hierarchy of the model. Perceived Risk does not only weaken women's evaluative orientation toward screening; it also directly intensifies their resistance to it, and it does so more strongly than any other structural relationship in the model.

Substantively, the interpretation is clear. When women perceive screening as emotionally stressful, physically unpleasant, socially uncomfortable, financially burdensome, functionally uncertain, or time-consuming, two things happen simultaneously: they evaluate the service less favorably, and they become more reluctant to engage with it. However, the strongest part of this process is not the attitudinal route, but the direct behavioral route. This suggests that reluctance is not merely a consequence of abstract opinion. It is also a direct reaction to the anticipated experiential cost of the service encounter.

From a marketing point of view, this is a powerful insight. It suggests that resistance to screening resembles resistance to other high-anxiety services: the expected experience itself may be enough to produce distance and withdrawal, even before a fully articulated negative attitude takes shape.

3.6. Mediation analysis

The next step was to test whether Attitude mediates the relationship between Perceived Risk and Reluctance. The indirect effect is reported in Table 11. The interpretation of mediation in PLS-SEM here follows the logic emphasized by Nitzl et al. (2016), namely that the indirect effect itself is the key criterion.

Table 11. Indirect effect

Hypothesis	Indirect path	Beta	t value	p value	Decision
H4	**Perceived Risk -> Attitude -> Reluctance**	0.082	1.672	0.095	Not supported

Source: Author's own elaboration based on SmartPLS output

The indirect effect is positive but does not reach statistical significance at the conventional 5% threshold. Therefore, the mediating role of Attitude is not supported.

At the same time, the numerical pattern remains informative. When the indirect component is added to the direct effect, the overall influence of Perceived Risk on Reluctance rises from 0.349 to approximately 0.431. In proportional terms, the indirect effect represents about 23.5% of the direct effect and about 19.0% of the total effect. These figures should be interpreted cautiously because the indirect path is not statistically significant, but they help illuminate the internal dynamics of the model.

The mediated route exists numerically, but it remains limited. Most of the influence of Perceived Risk on Reluctance remains direct rather than transmitted through Attitude.

This result is theoretically revealing. It suggests that women do not necessarily pass through a fully developed evaluative process before becoming reluctant. A substantial part of the effect of perceived risk seems to operate immediately. A woman may recognize that screening is beneficial and still hesitate because the service is already imagined as emotionally distressing, bodily uncomfortable, or psychologically draining. In that sense, reluctance appears to be driven more by the anticipated burden of the experience than by a stable attitudinal filter.

This is precisely the kind of finding that strengthens the article's contribution. It suggests that the challenge is not merely to improve women's attitudes, but also to reduce the immediate burden they associate with the screening experience itself.

3.7. Predictive relevance

To complement the explanatory assessment, the predictive relevance of the model was examined through Q^2predict, following Shmueli et al. (2019). The results are shown in Table 12.

Table 12. Q^2predict values

Construct	Q^2predict
Attitude	0.033
Reluctance	0.160

Source: Author's own elaboration based on SmartPLS output

Both values are above zero, indicating predictive relevance. However, the predictive relevance is clearly stronger for Reluctance than for Attitude. In fact, the model's predictive relevance for Reluctance is almost five times greater than for Attitude.
This result is fully consistent with the R^2 pattern discussed earlier. The model is more effective in anticipating who is likely to resist screening than in fully explaining the complete formation of women's evaluative orientations. This is not surprising. Behavioral reluctance is a more immediate outcome and therefore more directly tied to perceived burden, whereas attitudes are broader, more diffuse, and more likely to be shaped by additional unmeasured influences.
From a practical standpoint, this means the model has useful behavioral value. It is better at telling us who is likely to hold back from screening than at fully reconstructing every element of how women think about it. That is still an important contribution, especially when the aim is to understand and reduce avoidance behavior.

4. Discussion of the empirical findings

The empirical findings strongly support the central argument of the study: breast cancer screening is not evaluated solely as a medical recommendation, but also as a service experience shaped by anticipated costs and emotional meaning. Women's reluctance appears to reflect more than a lack of awareness. It also reflects the way the service itself is imagined before it is consumed.
The first important finding is that Perceived Risk is genuinely multidimensional. All six dimensions contribute significantly to its formation, which confirms that women do not approach screening through a single concern. Rather, they integrate multiple anticipated losses into a broader risk judgment. This gives empirical support to the idea that reluctance toward screening should be understood through a richer consumer-behavior framework.
The second major finding concerns the internal hierarchy of those dimensions. Psychological and Physical Risk emerge as the most influential components, while Time Risk is the weakest. This suggests that the core of women's resistance lies less in practical inconvenience and more in the emotional and bodily burden associated with the procedure. In other words, the service is not primarily rejected because it is difficult to organize; it is rejected because it is anticipated as stressful, uncomfortable, and personally demanding.
The third major finding is the structural dominance of Perceived Risk in explaining Reluctance. The direct path from Perceived Risk to Reluctance is the strongest in the model, and the model explains far more variance in Reluctance than in Attitude. This means that behavioral resistance is shaped more strongly by anticipated burden than by evaluative orientation alone.
The non-significant mediation result reinforces this interpretation. Attitude matters, but it does not fully carry the effect of Perceived Risk. In practice, women may understand the importance of early screening and still hesitate because the service itself feels emotionally or physically too costly. This gives the model an important practical implication: changing attitudes may help, but it will not be sufficient if the perceived burden of the screening experience remains high.
From a marketing standpoint, this is particularly valuable. In many service contexts, users do not withdraw merely because they think badly of the service in the abstract. They withdraw because the expected experience feels too costly. The same logic

appears to operate here. Screening reluctance is therefore not only a medical or informational issue; it is also an experiential and service-design issue.

5. Practical implications

The practical implications of the model are clear. Because Psychological and Physical Risk contribute most strongly to Perceived Risk, interventions focusing only on awareness or logistical access are unlikely to be enough. A woman may know that screening is beneficial and still remain reluctant if she anticipates fear, discomfort, pain, embarrassment, or emotional strain.

This means that screening promotion should go beyond the informational level. Public-health efforts should also target the emotional and experiential burden associated with the procedure. Reassurance, empathy, privacy, supportive communication, clearer procedural explanations, and a more humane care environment may be as important as communicating the medical value of screening. The issue is not only whether the service is beneficial, but whether it feels manageable and acceptable from the woman's point of view.

The relatively weak role of Time Risk also carries an important message. If time inconvenience is the least influential contributor, then strategies centered only on convenience, scheduling, or access will address only part of the problem. They may reduce friction at the margins, but they will not substantially affect the deepest barriers. The stronger leverage appears to lie in reducing emotional and bodily apprehension.

Finally, because Attitude does not significantly mediate the relationship between Perceived Risk and Reluctance, interventions aimed solely at improving women's evaluations of screening may not fully solve the issue. What seems more critical is reducing the direct burden associated with the anticipated service experience itself.

Conclusion

Women's hesitation to take part in early breast cancer screening is influenced not just by how much they know about the disease, but also by the way they imagine the screening process itself. The study found that perceived risk plays a major role in this reluctance, with emotional and physical concerns having the strongest impact. It also showed that higher perceived risk tends to reduce positive attitudes toward screening, while more favorable attitudes make women less reluctant. However, attitudes did not significantly act as a mediator in this relationship.

This research adds to existing literature by applying perceived risk theory to preventive healthcare services. It highlights that avoidance of breast cancer screening is not driven only by fear of the illness, but also by worries about what the screening experience may feel like. From a practical standpoint, the findings suggest that increasing participation in screening will require more than simply raising awareness. It will also be important to ease emotional discomfort, build trust, and make the screening process feel safer, more supportive, and more acceptable to women.

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