New Product Specification and Purchase Intention: Validating and Developing a Native Scale (NPPI-I)

Kambiz Heidarzadeh Hanzaee and Shadi Adibifard

Department of Business Management,
Science and Research Branch, Islamic Azad University, Tehran, Iran

Abstract: The main purpose of this study was to develop a new product purchase intention scale among Iranian consumers. Through this research two aspects of "new product performance" and "purchase intention value scale" were also evaluated. Literature review and the use of market experts' recommendations helped to create the appropriate product performance measures. In order to conduct the main study, the validity and reliability of these measures were tested by taking a sample with size of 392 (N=392) of the customers who had visited the store at least once in their life and had purchased the FMCG. Exploratory and confirmatory factor analyses were used to identify the product performance. An experiment was designed consisting of 39 product performance; 5 items of product specifications, 6 items of market potentiality, 8 items of technological aspects, 7 items of product novelty and its advantages, 6 items of R&D and marketing interface and 7 items of costumer behavior and their purchasing intentions. The present study demonstrated that new product purchase intention was highly related to the need and uniqueness aspects, product prices, trust, commitment and satisfaction.

Key words: Purchasing Scale Validation · Consumer purchasing intention · New Product performance measures

INTRODUCTION

In today's global and dynamic competitive environment, new product purchase intention is becoming more and more relevant as a result of three major trends: intense competition, fragmented and demanding markets and diverse and rapidly changing technologies [1]. In order to have sustainable competitive advantage, firms should offer products that are adapted to the needs and want of target customers and that market them faster and more efficiently than their competitors [2-5]. Competitive advantage is increasingly derived from knowledge and technological skills and experience in the creation of new products [6].

Within this context, special attention needs to be paid to the measurement of new product performance. Both researchers and practitioners require a good measurement instrument for this concept [7].

The concept "new product success" plays a major role in the ongoing research on product development. Often, new product success is correlated with variables describing the development process [7, 8, 9].

The last two decades show an increasing number of studies investigating the phenomenon of new product purchase intention. Many studies have been produced from a variety of theoretical perspectives leading to a growing number of variables that are assumed to affect new product performance, namely, product advantages, market orientation, firm's synergy, innovativeness, communication and information, cross-functional team, the integration between research and development (R&D) and the marketing department, proficiency of new product development activities, launch activities, etc. Furthermore, a variety of moderator variables have been studied in new product performance research. All these emphasize the need to search for meaningful ways to summarize the empirical findings of this field of research.

The need for a combination of research on new product performance has produced two meta-analyses on this subject [7, 10]. [7] meta-analysis provides a framework for classifying the numerous variables that have been assumed to be associated with new product performance. However, the meta-analysis performed on effects sizes

Corresponding Author: Shadi Adibifard, Ashrafee-e-Esfahani Highway, Hesarak Road, Zip code: 1477893855, Tehran, Iran.
Tel: +98-9123582138.

was not corrected for artifacts and did not provide a moderator analysis, procedures that can substantially improve the results of a meta-analysis [11].

In addition, purchase intention continues to be an important concept in marketing. The published literature contains a very small fraction of the actual studied which have used purchase intentions; nevertheless, the quality of literature is quite large. [12] Analyzed purchase intention along with other attitude measured used for predicting actual purchase behavior. [13] Presented a highly readable and interesting discussion on the use of purchase intention in evaluating the effectiveness of automobile advertisement. [14] Have purchase intentions in their well-known soft drink study. [15] Used purchase intention to segment markets for proposed new products. [16] Surveyed custom marketing research suppliers and found that the most popular purchase intention scale was the traditional 5- point intention scale:

- Definitely will not buy.
- Probably will not buy.
- Might/might not buy.
- Probably will buy.
- Definitely will buy.

[17] Compared predictions of purchase, from three alternative models. In each case, stated intentions data obtained from the 5-point scale are modified to predict trial purchase probabilities.

One of the basic models to explain purchase intention is the Satisfaction-Profit Chain or Relationship Quality Model (RQ) by [18], this model included high levels of relationship quality result in accordingly high levels of purchase intention and behavior also, many authors have used relationship quality concepts such as trust [19], commitment [20] and satisfaction [21] as antecedents of behavioral intention. So, it confirmed the emotional impact of this history of relationship on behavioral intentions [22]. Another widely used model to predict (buying) behavior is the *Theory of Planned Behavior* (TPB) [23, 24, 25, 26]:

- Attitude towards the behavior along with the impact of relevant reference people (referred to as the subjective norm) and
- The perceived control a customer has over the behavior under study (referred to as perceived behavioral control).

[27] Classify the antecedents of new project performance in four main categories:

- Strategy,
- Environment,
- Proficiency of execution of product development activities and
- Organizational variables.

The following was the basis of their classification: "New product performance is determined by the interaction of the market environment with new product strategy and development process".

Many studies only explain intentions and generally assume that they are good predictors of behavior. Checking this assumption of the role of intentions with the relevant contribution such as new product character and market needs is to be found. The other contribution is that it investigates whether attitudinal antecedents of intentions have an added value to predict purchase new product behavior and beyond actual past behavior or not.

MATERIALS AND METHODS

The study used a combination of new product performance and purchase intention model in two qualitative and quantitative phases. In qualitative aspects 30 experts in marketing, 5 of whom were highly educated experts in Iranian market and 25 were marketing PhD students. The population was entirely made of Iranian customer who had actually purchased their primary need of everyday life as FMCG. Data were collected from a sample of customers of three Iranian chain stores each with 20 low to mid-price range throughout the city suburbs and villages in Iran. The database was filled out by customers who had behavior of purchasing new product between April and June 2012 (spring season).

Data collection tools were questionnaires with 42 items, 5 Likert scale and direct interview. The main new product performance variables were namely, environment, technology, product characteristics, synergy, leadership, R&D and marketing interface. The purchase intention variables consisted of behavior purchase intention and communication quality with having the experts as source of information. The survey included environment variables, technology, product characteristics, R&D and marketing interface, behavior purchase intention and communication quality which were determined in conceptual model of the research (Figure 1).
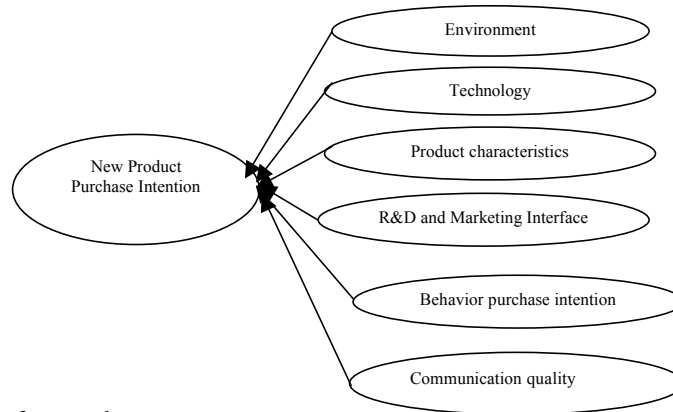
Fig. 1: Conceptual model of research

During the survey time 450 customers in 20 stores participated in the survey out of which 392 were valid. Discriminate, criterion and concept validity were used and composite reliability with 392 data as well as internal consistency with 30 data were tested and the next step was considering construct validity with the explorer factor analysis and Varimax Rotation. Finally confirmatory factor analysis was evaluated.

RESULTS AND DISCUSSION

Qualitative Results: By studying the extant literature and findings of previous domestic and foreign research projects, the conceptual model was developed from the combination of two models as new product performance and purchase intention. In these two models 4 main factors such as, environment, strategy, organizational process for new product performance, perceived behavior control, subjective norms, attitude toward the behavior, behavior purchase intention, communication quality for purchase intention construct were identified. These two models were then proposed through experts vote (N = 35). Environment, Technology, Product characteristics, R&D, Marketing Interface, Behavior purchase intention and Communication quality were selected from all factors with 95% agreement.

Factor Adequacy: In the first phase after data collection, exploratory factor analysis (EFA) was employed using SPSS software. In order to ensure adequacy of sample for conducting EFA, Kaiser-Meyer-Olin (KMO) test was used. For the first construct (Environment) = 0.69, second construct (Technology) = 0.761, third variable (Product characteristics) = 0.65, fourth construct (R&D and Marketing Interface) = 0.66, fifth one (Behavior purchase intention) = 0.78 and the last variable (Communication

quality) = 80 reported which suggested adequacy of sample for conducting EFA. Hence, irrelevant items were deleted. Commonalities are shown in Table 1. Commonalities below 0.5 were eliminated because of irrelevancy of items. At the end of EFA, items were reduced to 41 out of 43; 23 for new product performance and 18 for purchase intention.

Reliability of Scales: All the scales were reliable, with the composite reliabilities ranging from 0.62 to 0.77, all greater than the benchmark of 0.50. Table 1 shows the reliability level for each scale and factor loadings for each item in the scale. The internal consistency (Cronbach's Alpha) for each variables reported the Environment = 0.71, Technology = 0.81, Product characteristics = 0.71, R&D and Marketing Interface = 0.83, Behavior purchase intention = 0.72, Communication quality = 0.83 and totally = 0.91.

Validity of Scales: Discriminant validity method was used as described by [28] in which shared variance is compared with AVE and AVE of each construct should be greater than the shared variance with any other construct which was confirmed. In all cases, as presented by the information in Table 2, the [28] test used for all pairs of constructs, there was discriminate validity; the constructs were distinctly different from each other. The concept and Criterion validity was also confirmed.

Factor Analysis Results: The exploratory factor analysis (EFA) indicated that the most influential component of new product purchase intention and the identification of variables had an effect on each of the main components of exploratory factor analysis. Thus, 6 factors were identified in EFA ordered by their importance as factor 1 with 5 items and variance of 64.1, factor 2 with 6 items and

Table 1: Factor loading and composite reliability (CR)

Items and Composite Reliability	Factor loading
Environment(CR=0.789)	.489
Q2	.548
Q3	.890
Q4	.886
Q5	.814
Q6	.880
Q7	.867
Q8	.944
Technology(CR=0.687)	.902
Q10	.884
Q11	.894
Q12	.919
Q13	.835
Q14	.891
Product characteristics (CR=(0.612)	.847
Q16	.511
Q17	.758
Q18	.785
Q19	.772
R&D and Marketing Interface (CR=0.619)	.744
Q21	.564
Q22	.676
Q23	.783
Behavior purchase intention (CR=0.625)	.672
Q25	.631
Q26	.574
Q27	.608
Q28	.584
Q29	.454
Q30	.332
Q31	.890
Q32	.886
Communication quality (CR=0.702)	.814
Q34	.880
Q35	.867
Q36	.944
Q37	.902
Q38	.884
Q39	.894
Q40	.919
Q41	.835
Q42	.891
Q43	.847

variance of 71.45, factor3 with 8 items and variance of 76.58, factor 4 with 7 items and variance of 79.66, factor 5 with 6 items and variance of 57.67and finally, factor 6 with 7 items and variance of 64.59 were explained.

As the prior domestic and foreign research projects literature considered, the six items which were related to factor number 1 was identified to be the product personality as [27] clarified it, product characteristics, the other six items by factor 2 clarified market potential,

market competition and uncertainly, the other item with 8 factors related to technology as orientation and competitors, nine items related to factor 4 which was mostly identified product newness to the firm and product advantage as well as 6 items exposure factor 5 exactly indicate R&D and Marketing Interface construct named interaction and outer action of producer and the last factor as factor 6 with 8 items related to behavior purchasing intention and communality quality like before and after purchases [29, 30], as well as, advertisement, services and vendors as [31, 32] identified the relationship quality.

Root, Mean, Square Error of Approximation (RMSEA) and the Comparative Fit Index like CFI values between 0.90 and 0.95 and/or RMSEA values between 0.05 and 0.08 indicated an acceptable model fit and CFI values were larger than 0.95 and/or RMSEA values were smaller than 0.05 which demonstrated a good model fit [33].

Confirmatory factor analysis (CFA) using LISREL software was conducted in order to purify the measure. Extracted model was of good fitness (RMSEA = 0.08, CFI= 0.91, NFI = 0.95, NNFI = 0.92, GFI = 0.91). The t-value reported in model irrelevant items were eliminated and total items decreased to 42:39 for new product purchase intention value.

The main purpose of the present study was to develop and validate a new measurement instrument as new product and the purchase intention for it among Iranian customers who purchased FMCG in their routines which based on [7, 10, 27] and [18] approaches.

Such a measurement instrument was needed to investigate the general development of new product purchase intention for Iranians (NPPI-I) and to study the causes and consequences of NPPI in Iranian culture especially among families. The most important factor which caused the intention to buy named price as most of families regard it as the first factor. However, these assumptions are not yet to be validated. In order to create the Native new product purchase intention Values Scale the researchers adapted the items from the original two values as purchase intention and new product performance. Then, in order to test its reliability and validity, NPPI-I was administered to 392 customers who had frequented at least once to the identified chain stores. Data analysis identified 6 factors that had significant relationship with the NPPI first factor namely product personality which was related to the product appearance as it was shown in conceptual model named product characteristics and second-order component. In comparison with the qualitative stage (logical model), product appearance was considered an

Table 2: Discriminent validity matrix

	Environment	Technology	Product characteristics	R&D and Marketing Interface	Behavior purchase intention	Communication quality
Environment	0.780					
Technology	0.334	0.752				
Product characteristics	0.261	0.268	0.791			
R&D and marketing Interface	0.262	0.227	0.475	0.644		
Behavior purchase intention	0.304	0.275	0.349	0.317	0.839	
Communication quality	0.373	0.291	0.455	0.255	0.442	0.789

asset for a customer when compared to the other components. [7] Montoya et al separated it into 4 class as Product advantage, Product newness to the firm, Degree of Radicands and Degree of customization. The second factor which affected the research's conceptual model was market potential or market competition or uncertainly which further explained the environment as in the pervious study. Technology as the third factor was more related to market and competitors of product line as [10] find it in the meta- analysis. Product newness and product advantage was the fourth factor as [7] explained it in product characteristics, but in this study it was observed otherwise. R&D and Marketing Interface construct related to fifth factor, indicated that the company effort to make an actually new product which kept its uniqueness among product rank from the consumer perspective as [7], 1994 found it interfunctional coordination. The last and sixth factor depended on consumer behavior and post purchase intention, named behavior purchase intention and communality quality, as [18] explained it. Relationship quality model (RQ). The first main finding of this study was that new product purchase intention was a second-order construct with 6 underlying factors. Researchers could use the full set of NPPI-I items in order to study new product purchase intention as a general concept. The second main finding of this study was that the NPPI-I perform just as well as the other 39 items in terms of reliability and empirical usefulness for Iranians. In further research, the variety of population suggested that other social groups should also be evaluated. In addition, by using the NPPI-I for different products like industrial or consumption or various social groups and different cultures in Iran, new product purchase intention scale could be studied across the peoples' class level. Inclusion of more factors such as trust [19], commitment [20] and satisfaction [21] as antecedents of behavioral intention is highly recommended.

REFERENCES

1. Wheelwright, S.C. and K.B. Clark, 1992. Revolutionizing Product Development - Quantum Leaps in Speed, Efficiency and Quality, The Free Press, New York, NY.

2. Prahalad, C.K. and G. Hamel,1990. The core competence of the corporation, Harvard Business Review, 68(3): 79-91.

3. Amit, R. and P. Schoemaker, 1993. Strategic assets and organizational rent, Strategic Management Journal, 14(1): 33-46.

4. Nonaka, I. and H. Takeuchi, 1995, The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation, Oxford University Press, New York, NY.

5. Calantone, R.J., S.K. Vickery and C. Dro¨ge, 1995. Business performance and strategic new product development activities: an empirical investigation, Journal of Product Innovation Management, 12: 214-23.

6. Teece, D.J., G. Pisano and A. Shuen, 1997. Dynamic capabilities and strategic management", Strategic Management Journal, 18(7): 509-33.

7. Montoya-Weiss, M.M., R.J. Calantone, 1994. Determinants of new product performance: a review and meta-analysis, Journal of Product Innovation Management, 11: 397-417.

8. Davidson, J.H., 1976. Why most new consumer brands fail, Harvard Business Review, 54(2): 117-22.

9. Kratzer, J., R.T.A.J. Leenders and J.M.L. Van Engelen, 2004. Stimulating the potential: creative performance and communication in innovation teams, Creativity and Innovation Management, 13(1): 63-71.

10. Henard, D.H. and D.M. Szymanski, 2001. Why some new products are more successful than others", Journal of Marketing Research, 38(3): 362-75.

11. Hall, J.A., L. Tickle-Degnen, R. Rosenthal and F. Mosteller, 1994. Hypotheses and problems in research synthesis, In: H. Cooper and L.V. Hedges, (Eds), The Handbook of Research Synthesis, Russell Sage Foundation, New York, NY.

12. Axelrod, J.N., 1968. Advertising Measures that Predict Purchase, Journal of Advertising Research, 8: 3-17.

13. Smith, G., 1965. How GM Measures Ad Effectiveness. Printer's Ink, pp: 19-22.

14. Silk, A.J. and G.L. Urban, 1978. Pre-Test-Market Evaluation of New Packaged Goods: A Model and Measurement Methodology. Journal of Marketing Research, 15(5): 171-191.

15. Sewall, M.A., 1981. Relative Information Contributions of Consumer Purchase Intentions and Management Judgment as Explanatory of Sales, Journal of Marketing Research, 18: 249-253.

16. Johnson, Jeffrey S., 1979. A study of Accuracy and Validity of purchase Intention Scales Phoenix, AZ: Ar-Mour-Dial Co. privately circulated working paper.

17. Jamieson, Linda, F. and Frank M. Bass, 1989. Adjusting stated Intention Measures to Predict Trial Purchase of new Products: A comparison of Models and Methods, Journal of Marketing Research, 26(3): 336-345.

18. Reichheld, Fred F., 1996. The loyalty effect: the hidden force behind growth, profits and lasting value. Boston: Harvard Business School Press.

19. Morgan Robert, M., D. Hunt Shelby, 1994. The commitment-trust theory of relationship marketing. Journal of Marketing, 58(3): 20-38.

20. Pritchard Mark, P., E. Havitz Mark, R. Howard Dennis, 1999. Analyzing the commitment-loyalty link in service contexts. Journal of the Academy of Marketing Science, 27(3): 333-48.

21 Zeithaml, Valerie A., R. Berry Leonard and A. Parasuraman, 1996. The behavioral consequences of service quality. Journal of Marketing, 60(2): 31-46.

22. Ebner Manual, A., H. Arthur, L. Levitt Daniel and J. McCrory, 2002. How to rescue CRM. McKinsey Quarterly, Special Edition;. Www.mckinseyquarterly. co.

23. Ajzen I., 1991. The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50: 179-211.

24. Ajzen, I., 2002. Perceived behavioral control, self-efficacy, locus of control and the theory of planned behavior. Journal of Applied Social Psychology, 32(4): 665-83.

25. Armitage Christopher, J. and M. Connor Ichael, 2001. Efficacy of the theory of planned behavior: a meta-analysis. British Journal of Social Psychology, 40(4): 471-99.

26. Ouelette, J.A. and W. Wood, 1998. Habit and intention in everyday life: the multiple processes by which past behavior predicts future behavior. Psychological Bulletin, 124(1): 54-74.

27. Pattikawa Lenny, H., E. Verwaal and R. Commandeur Harry, 2004. Understanding New Product Project Performance. European Journal of Marketing, 40(11/12): 1178-1193.

28. Fornell, C. and DF. Larcker, 1981. Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing, Research, 18(1): 39-50.

29. Cronin Joseph, J. and A. Taylor Steven, 1992. Measuring service quality: a reexamination and extension. Journal of Marketing, 56(3): 55-68.

30. Rossiter, John R., 2002. The C-OAR-SE procedure for scale development in marketing. International Journal of Research in Marketing, 19(4): 305-36.

31. Rust, Roland T., J. Zahorik Anthony and L. Keiningham, 1995. Timothy Return on quality (ROQ): making service quality financially accountable. Journal of Marketing, 59(2): 58-70.

32. De Wulf, K., G. Odekerken-Schröder and D. Iacobucci, 2001. Investments in consumer relationships: a cross-country and cross-industry exploration. Journal of Marketing, 65(4): 33-50.

33. Kline, R.B., 2005. Principles and Practice of Structural Equation Modeling. 2nd Edn., The Guilford Press, New York.