

## THE ROLE OF BUNDLED MAINTENANCE WARRANTIES

Robert S. Owen, The Ohio State University  
Martha C. Cooper, The Ohio State University

### Abstract

Signal Theory posits that a product warranty functions as a cue to product reliability and therefore functions to lower risk to the consumer. The results of the survey reported here suggest that this notion is not universally true in some situations involving a long-term microcomputer maintenance warranty. These results suggest that the strategic desirability of bundling a long-term maintenance warranty with a complex product is limited.

### Introduction

Ralph Breyer (1965) scolded marketers several years ago for thinking in terms of "products" rather than "product offerings" which include the services that necessarily must accompany a physical product. A number of practitioners have recently commented on the increasing competitive importance of post sale service as an integral component of increasingly complex products, including Art Sherman of Sharp Electronics (Sherman 1988), Jim Manzi of Lotus ("After the Revolution" 1990), and Norman Chismon of MSI Data Limited (Chismon 1987). It is possible that the "core" features of many products may become competitively reduced to mere "minimal requirements" (Cina 1989) or "Do or Die" features (Lovelock 1989) as competitive advantage begins to shift, in some cases, toward other "supplementary" aspects of the product offering. Although the post-sale aspects of a complex product such as a microcomputer include such services as training and software support, of particular interest in the present paper are product aspects associated with maintaining satisfactory product performance.

Unfortunately, complex products such as microcomputers do occasionally break down. According to one maintenance organization, approximately 10% of electronic devices can be expected to fail sometime during a given year (Hayashida 1980). Prospective purchasers of such products are likely to have difficulty assessing product maintainability and reliability because these attributes are associated with future events that cannot be physically examined before purchase. Since these attributes are "hidden qualities" that are "not testable", they are expected to represent some amount of risk to the prospective purchaser (Zikmund and Scott 1975). The survey reported here was an attempt to assess the relationship between post-sale product maintenance options and prospective purchasers' perceptions of product reliability and ownership risk.

### Reliability, Risk, and Warranty

Some products will break down at some future point in time, and the probability that the product will operate satisfactorily for a given period of time under a given set of conditions is denoted as reliability (Churchley 1984; Hall 1977; Sandberg 1987; Wright 1982).<sup>1</sup> This implies that there is some level of ownership risk associated with product performance over the life of the product. Inherent with the potential for a product to break down sometime during its

lifetime, there is a likelihood that the purchaser will exceed an unsatisfactory level of inconvenience due to breakdowns, denoted as performance risk, and a likelihood that the purchaser will exceed an unsatisfactory level of financial outlay due to breakdowns, denoted as financial risk (cf., Jacoby and Kaplan 1972; Kaplan, Szybillo, and Jacoby 1974). The prospective purchaser will presumably attempt to choose a product that will minimize such risks (cf., Roselius 1971).

There appear to be two general ways in which these risks to a prospective purchaser could be lowered. The first is to provide perceptively better levels of post-sale service support. The frequency of product failure or the number of expected future product breakdowns throughout the period of ownership is unknown and difficult to assess by the prospective purchaser. If a prospective purchaser associates an equal amount of uncertainty with the reliability of two products, the likelihood of exceeding an unacceptable level of inconvenience or financial cost throughout the life of the product will be dependent on the kind of post-sale service support that is available. Service support that can be obtained at locations most convenient to the prospective purchaser, for instance, should lower the likelihood that the purchaser would exceed an unsatisfactory level of inconvenience over the life of the product.

A second way to reduce these risks to a prospective purchaser is to perceptively increase the reliability of the product. A product that can be expected to break down less frequently throughout its useful life could be expected to be less costly in terms of inconvenience and financial outlay associated with maintaining original performance. One way that has been suggested for increasing the prospective purchaser's perception of product reliability, thereby lowering perceived risk, is the product warranty. Kendall and Russ (1975, p. 36) defined the warranty as "an affirmation by the seller of the quality or performance of the goods he is trying to sell." Udell and Anderson (1968) suggested that a warranty can in this way be useful as a promotional strategy. That a product warranty can function as a promotional tool by inferring higher levels of product "quality" or reliability, thereby increasing prospective purchasers' confidence in the future performance of the product, is echoed by most marketing textbooks (e.g., Kotler 1988, p. 649-650).

The promotional warranty discussed by Udell and Anderson is supported by Signal Theory (Kelly

<sup>1</sup>Reliability is discussed here as a specifically defined component of product "quality". Quality can be defined as "conformance to specifications"; reliability is associated with a time dimension of quality (Sandberg 1987). Many features associated with product "quality" are subject to physical inspection of the product, whereas reliability as a specific product feature can be difficult to assess by both the purchaser and the manufacturer (cf., Sandberg).

1988; Priest 1981; Spence 1977). Signal Theory posits that the prospective purchaser will perceive the product warranty as a signal of product reliability, thereby encouraging purchase of the warranted product, since a manufacturer offering a warranty has an economic incentive to produce a product that will require less maintenance. Although both Kelly (1988) and Weiner (1985) did find a relationship between Consumer Reports ratings of product reliability and warranty attributes for several classes of consumer goods, similar studies by Bryant and Gerner (1978), Gerner and Bryant (1981), and Priest (1981) failed to support the assertion that warranties are effective or accurate signals of product reliability. In one of the few empirical studies to involve consumer perceptions, Dowling (1985) found that the inclusion of a warranty in print advertisements had no effect on perceived risk or intention to purchase the advertised products. An economic model proposed by Lutz (1989) suggests that high product "quality" can be signaled by a low warranty to some consumers.

In addition to discussing the the promotional warranty, which is designed to encourage purchases by reducing risks to the consumer, Udell and Anderson (1968) also discussed the protective warranty, which is designed to protect the seller. It is conceivable, then, that a warranty can also function as a signal of the protective value of a warranty for the manufacturer's benefit. That is, it seems reasonable to consider that as a product attribute, a warranty may not always enhance a product from the perspective of the consumer.

For instance, a manufacturer may wish to increase the reliability of its products by limiting repair servicing to only factory trained service people using only the original equipment manufacturer's (OEM) parts for making repairs. For the manufacturer, a warranty that limits repair service only to specific authorized repair facilities using only authorized repair parts ensures that the product will be maintained to a known and acceptable level of performance and reliability throughout its useful life. Some prospective purchasers may perceive such a warranty as a signal of greater product reliability, and therefore of lowered risks of ownership.

Some prospective purchasers, however, may perceive such a warranty as constraining their options for product maintenance, limiting their choice of repair facilities to those with inconvenient locations or hours of operation, excluding lower cost aftermarket repair parts and excluding the user from performing his own product maintenance. This situation could also be viewed by the consumer as eliminating any direct competition to the service provider once the consumer has made the purchase, eliminating any incentive for the seller to provide good levels of post-sale service (cf., Ghosh and Craig 1986). It is possible that to these prospective purchasers, the options for obtaining post sale maintenance may be more important than the reliability that is signaled by a warranty, and the warranty may even be perceived as no signal at all or even as a negative signal.

#### Hypotheses

It seems, then, that a high level of post-sale OEM service support as evidenced by a comprehensive OEM maintenance warranty would be desirable to some prospective purchasers. To others,

however, a comprehensive, long-term OEM maintenance warranty could be viewed as a constraint on the options for obtaining convenient and cost effective post-sale maintenance. Although a comprehensive long-term warranty may function as a promotional device by increasing the perception of product reliability for some prospective purchasers, such a warranty may be viewed as an undesirable product attribute by others. It is possible that some consumers desire warranted products because they feel that a warranty provides greater assurance of an acceptable level of product reliability. Other consumers may not perceive a warranty to be a signal of product reliability, and a warranty might then become an undesirable, constraining product feature.

It is possible, then, that a bundled product warranty is not universally perceived as an indicator of higher product reliability. More specifically, it is hypothesized that:

**H1:** Potential product purchasers who have a preference for OEM service support will have a greater tendency to believe that the bundling of an OEM maintenance warranty is an indicator of higher product reliability than those who do not have a preference for OEM service support.

Shimp and Beardon (1982) manipulated warranty quality to examine the effects of this and other extrinsic cues on consumer perceptions of the financial and performance risks involved with innovative product concepts. Subjects were found to perceive less financial risk in high warranty conditions, but the effect on performance risk was not significant. This result seems to conflict with the assertion of Signal Theory that warranty is a cue of reliability. According to Signal Theory, high warranty conditions should be a cue of high product reliability, and this should result in decreased perceived performance risk.

If H1 is supported, then we might expect consumers who prefer OEM service support to perceive a warranty/performance risk relationship as posited by Signal Theory. Prospective purchasers who do not prefer OEM servicing, however, may not perceive a warranty/performance risk relationship or may even associate a forced reliance on OEM servicing with increased performance risk due to the inconvenience associated with reliance on a single source for maintenance when the product breaks down.

It is possible, then, that a bundled product warranty is not universally associated with reduced performance risk. More specifically, it is hypothesized that:

**H2:** Potential product purchasers who have a preference for OEM service support will have a greater tendency to believe that the bundling of an OEM maintenance warranty reduces performance risk than those who do not have a preference for OEM service support.

Although Shimp and Beardon (1982) did find subjects to perceive less financial risk under high warranty conditions, it is possible that not all potential product purchasers will perceive reduced financial risk associated with products having bundled warranties. As the extended warranty was discussed by Perry and Perry (1976) as a kind of insurance, we might expect it to lower the perception of financial risk to those consumers who desire this attribute. However, if

consumers do not desire this attribute, but prefer instead to have the option of providing for their own service, only this latter option should lower financial risk to these consumers. This latter group of consumers may associate higher costs with a forced reliance on the OEM as the sole service provider than if they had the option of arranging for their own product maintenance.

It is possible, then, that a bundled product warranty is not universally associated with reduced financial risk. More specifically, it is hypothesized that:

H3: Potential product purchasers who have a preference for OEM service support will have a greater tendency to believe that the bundling of an OEM maintenance warranty reduces financial risk than those who do not have a preference for OEM service support.

#### Method

##### Subjects

The survey was administered to two international business classes (completed surveys n=65) on the main campus of a large midwestern university and one marketing principles class (completed surveys n=21) on a regional branch campus. None of the classes were those of the authors, and the authors were likely to be unknown to most of the surveyed students. Students were told that their responses were strictly voluntary and anonymous, that no extra credit would be given for participation, and that their responses might help the authors to obtain a grant to conduct further research in this area. Ninety-seven survey forms were distributed and 88 were returned. Two were not usable because not all questions were answered, yielding a total usable sample size of 86.

Respondents were asked a series of questions regarding alternative microcomputer products. Since the survey was administered to upper-level undergraduate business classes, most students are expected to have some familiarity with microcomputer use through previous classwork. Additionally, microcomputers are heavily promoted toward students in the campus newspaper, and it seems reasonable to assume that students are prospective purchasers of this product class.

##### Design and Procedure

The first survey question was used to classify the orientation of the respondents regarding their warranty preference. Respondents were classified as having a preference for an OEM warranty (long term maintenance warranty at extra cost), as having a preference for non-OEM maintenance (pay a local repair facility whenever the equipment breaks down), or as having absolutely no preference, by choosing one of five preference options. Fifty-five respondents were classified as having an OEM warranty maintenance preference and 13 were classified as having a non-OEM maintenance preference. In order to perform an analysis on groups that were more equal in size, the "no preference" respondents were added to the latter group, yielding an prefer OEM group of size n=55 and a don't prefer OEM group of size n=31. The results that we report are for this latter grouping. The magnitudes of the group differences are even greater than those that we report when the "no preference" respondents are

not included in the analysis.

Two alternative microcomputer products were then described. The non-OEM product (Product A) does not offer an OEM warranty (long-term warranty at extra cost), but it should not be difficult to obtain servicing of this product from some other (third-party) source. The OEM product (Product B) offers an OEM warranty (long-term warranty at extra cost), but it may be difficult to obtain servicing of this product from another (third-party) source. Respondents were asked to indicate their level of agreement or disagreement with seven statements regarding these alternative products on a 5-point scale (SD=1, SA=5). Three questions were meant to measure perceived product reliability (Q3, Q4, Q9), while two were meant to measure perceived performance risk (Q5, Q7) and two to measure perceived financial risk (Q6, Q8). Questions regarding perceived risk were adapted from Jacoby and Kaplan (1972). Question Q2 was related to an additional conjoint task that is not relevant to the present study.

Q3, (Q4) Product A (Product B) is likely to be extremely reliable.

Q5, (Q7) There is a high chance that I will be inconvenienced if I purchase Product A (Product B) because I must rely on someone other than (must rely only on) the manufacturer to keep it in good shape.

Q6, (Q8) There is a high chance that I will lose money if I purchase Product A (Product B) because it may cost more than it should to keep it in good shape if I must rely on someone other than (must rely only on) the manufacturer.

Q9 Product B is likely to be less reliable than Product A.

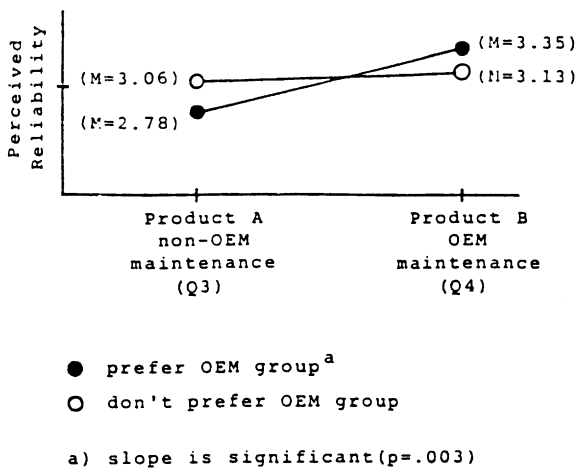
##### Results

All hypotheses were tested using multiple one-sided t-tests. Paired t-tests (test that the mean difference equals zero or flat line) were used to compare the responses between pairs of questions within each group, and t-tests were used to compare the responses between the two groups on each individual question. (Due to limited space, complete tables of results could not be included and can be provided on request.)

Hypothesis H1 is weakly supported (Fig. A). The prefer OEM group did perceive the OEM product as slightly more reliable than the non-OEM product (p=.003). The don't prefer OEM group did not perceive any difference in reliability between these products. The small difference between the groups, however, did not achieve significance<sup>2</sup>.

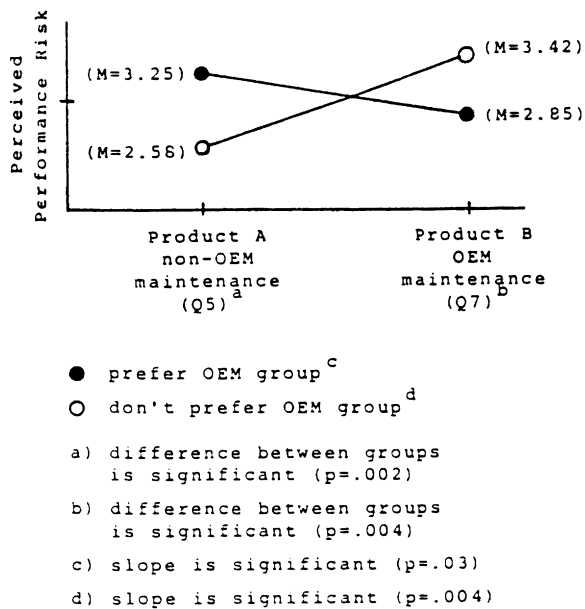
<sup>2</sup>The difference between group responses to Q9 was small but significant (p=.04). When the "no preference" group was separated from the don't prefer OEM group, the don't prefer OEM group showed a marginally significant difference in perceived reliability of the two products in a direction opposite to that of the prefer OEM group (p=.05). The difference between these two groups was significant for both the non-OEM product (p=.02) and the OEM product (p=.02).

FIGURE A  
GROUP DIFFERENCES IN PERCEIVED RELIABILITY



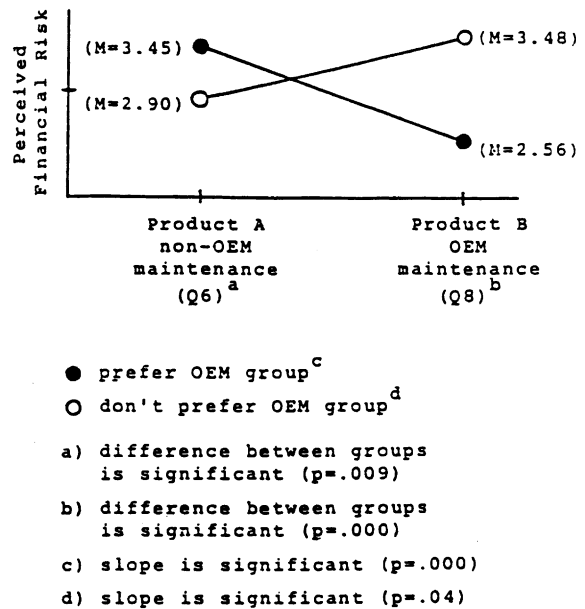
Hypothesis H2 is supported (Fig. B). The prefer OEM group perceived less performance risk associated with the OEM product than with the non-OEM product (p=.03). The don't prefer OEM group perceived less performance risk associated with the non-OEM product than with the OEM product (p=.004). The two groups differed significantly in their perceptions of risk associated with both the non-OEM product (p=.002) and the OEM product (p=.004).

FIGURE B  
GROUP DIFFERENCES IN PERCEIVED PERFORMANCE RISK



Hypothesis H3 is supported (Fig. C). The prefer OEM group perceived less financial risk associated with the OEM product than with the non-OEM product (p=.000). The don't prefer OEM group perceived less financial risk associated with the non-OEM product than with the OEM product (p=.04). The two groups differed significantly in their perceptions of risk associated with both the non-OEM product (p=.009) and the OEM product (p=.000).

FIGURE C  
GROUP DIFFERENCES IN PERCEIVED FINANCIAL RISK



#### Discussion

Signal Theory posits that a product warranty functions as a cue to product reliability and therefore to lower risk to the consumer. Although this may be typical for many classes of consumer goods, the results of this survey suggest that this relationship may not be universally true. Since one would expect the seller to exchange a malfunctioning microcomputer product within the first thirty days or so after the purchase, there is essentially no short-term risk associated with purchasing this product. Long-term product performance would then be expected to be more important. In this situation, at least with this product class, some people do appear to perceive the offering of an OEM maintenance warranty to be a cue to greater product reliability and to lower risks associated with ownership. Some people, however, appear not to perceive the offering of a product warranty to be a cue to greater reliability, and to associate increased risk with reliance on the manufacturer for future product maintenance.

A limitation of this study is that the risk construct was very narrowly defined in the survey. Although two different measures of risk on each of two alternative products were taken, respondents were given specific reasons for considering the risk that may be associated with owning the two products used in this survey. We felt that we had to qualify each question with a "because" statement to ensure construct validity. That is, we wanted to ensure that all respondents interpreted each question in the same way and that each respondent's reasons for considering the risks that may be associated with each of the two products were consistent and symmetrical. Prospective product purchasers may not normally consider these reasons, limiting the external generalizability of the results reported here. Nonetheless, these results do suggest that Signal Theory is not universally true.

An additional limitation is that the independent variable (preference for OEM service) is measured rather than manipulated. It is likely this preference covaries with differences in respondent experience, interest, or knowledge, and therefore possible that something other than preference drives the results of this survey. Although further research is needed to clarify the causal relationship, the results do nonetheless suggest that Signal Theory is not universally true.

Although the product described in this survey offered the warranty at additional cost, these results should be generalizable to the more realistic situation in which a long-term warranty is bundled with the product (e.g., a higher cost product with a lifetime warranty). Some prospective purchasers apparently perceive the higher cost warranted product as more reliable and as one that lowers performance and financial risk. However, purchasers of such a product would be forced to rely on the manufacturer to take advantage of under-warranty maintenance. Some consumers may not necessarily associate higher product reliability with the warranty, and a warranty that forces reliance on the manufacturer for all future maintenance may create a competitive disadvantage to that product.

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