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**Product Recall versus Business as Usual:
A Preliminary Analysis of Decision-Making in
Potential Product-related Crises**

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A Introduction

Product recalls have become an almost familiar phenomenon in a consumer's daily life. The reasons for this include the increasingly advanced and – at the same time – vulnerable technology of consumer products and the emergent law of strict liability of manufacturers and dealers in the US and Europe. This paper deals with the seller's choice situation. The seller has more or less vague evidence of potential damages which could possibly be related to the use or misuse of his products, altogether indicators of a potential product-related crisis. In such a situation, the seller must decide whether to initiate an immediate product recall or to continue with business as usual, whereas the second option may involve a recall at a later date.

The analysis of the choice situation is a preliminary one. The academic literature concerning recall behavior is rather sparse. The first part of the paper, therefore, merely collects and discusses some of the relevant factors pro and contra product recalls, as mentioned in various reports and case analyses. The result is a system of factors, such as evidence of damage and of a liability risk, efficiency and speed of a recall, and the availability of other measures, e.g. warnings, the relative importance of the product (substitutes in sight?), significant and minor influence of relevant media, the seller's reputation and ability, the willingness of consumers to cooperate, etc.

The second part of the paper takes a closer look at two of the previously mentioned factors: the seller's reputation and the time span between gathering initial evidence of a crisis and the recall. Both factors have already been empirically analyzed before. The findings, hitherto, are based on US data and do not seem to fit to our analysis of variance, which is based on a representative German sample of consumers. After this international comparison there will be a brief outlook containing remarks on managerial implications.

B Pros and Cons of a Product Recall: Some Main Factors

1. There is, hitherto, no such thing as a theory of entrepreneurial choice between a product recall on one hand and continuing with business as usual on the other. A first attempt can be found in a paper by Linda Welling, which contains a very complex structure of decision making that is far from empirical justifications. Secondly, there have, of course, been a wide range of attempts to combine the recall decision with economic consequences, such as variations in market value of the firm and its market share. There are quite a few papers of this

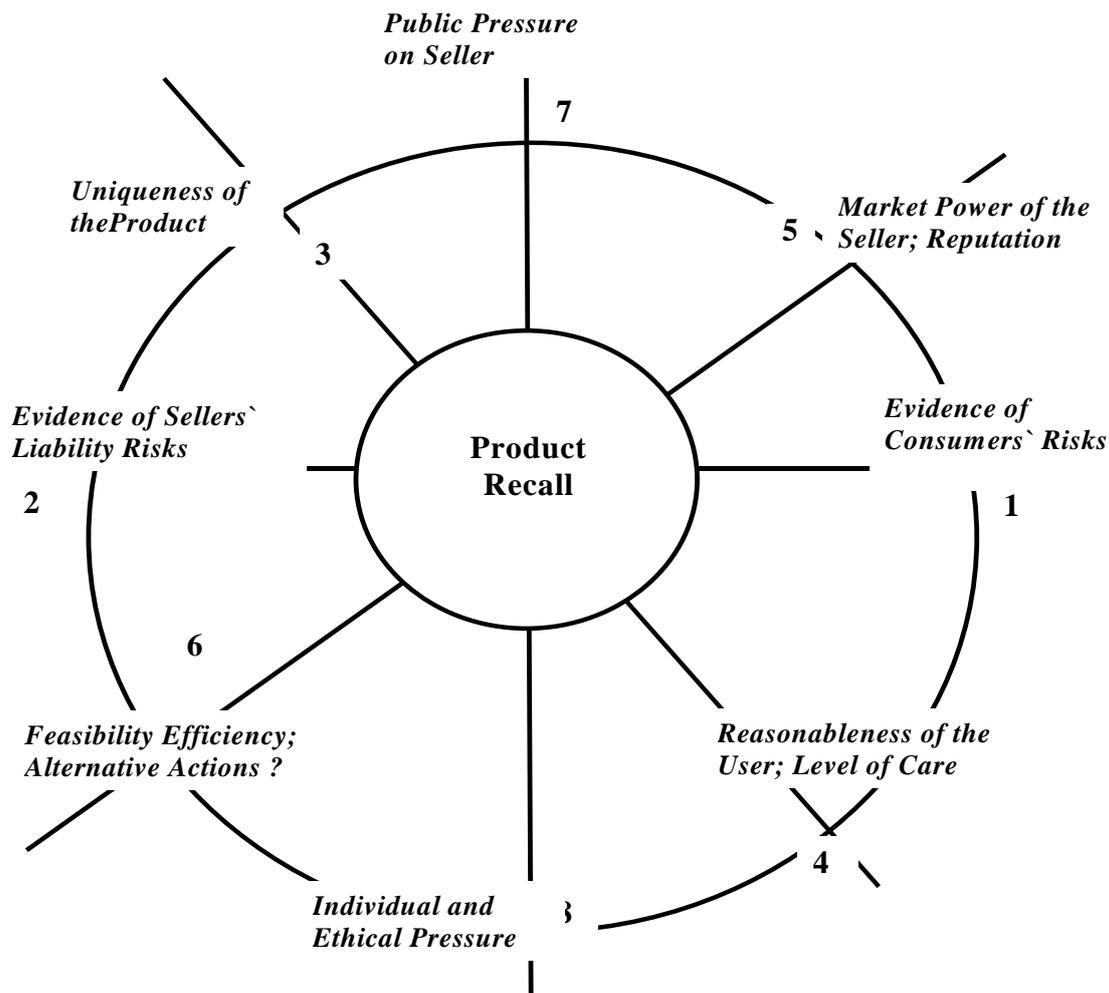
kind, most of which deal with the recall of automobiles and go back to the 1985 seminal paper of Jarrell and Peltzman.

This series of analyses does not focus on the decision "recall: yes or no," but merely estimates the side effects of a realized recall. It may, however, be very worthwhile to look at these side effects when considering a product recall. Moreover, there are other factors that also have to be taken into account. Which factors are relevant to making the decision between recalling a product and continuing with business as usual?

The following analysis is highly speculative. This is due to the very poor empirical data base. In recent years, I have collected data from over 1000 recalls from publications in print and electronic media, focussing on household products, drugs, sports equipment and, of course, automobiles. Comparable data have been collected and published by insurance firms, automobile associations, and regulatory agencies both in Germany and the US. Unfortunately, however, these data bases have crucial defects: firstly, there is no systematic information about choice situations which ends up in abandoning the idea of a recall and, instead, silently continuing with business as usual. There is only anecdotal evidence of one or the other case.

Secondly, the empirical basis is poor because the recall situations referred to do not reveal any arguments that management had in mind when considering the recall. Indeed, it is specifically these arguments that are the main determinants we aim to shed light upon. There is, of course, always the method of gathering relevant factors by interviewing management in such crucial choice situations. Such interviews, however, are not a feasible way, and there are considerable doubts that managers would give any other answers than the socially accepted, political correct ones in these situations. My analysis of the main factors, hitherto, must therefore be a speculative one.

2. The focus of my analysis is on eight factors, presented in fig. 1. These factors should be seen as categories, which may take on small or higher values leading to different decisions. Consider, for example, factor 7, which indicates the degree of pressure exercised by the public (media, regulatory agencies) on the seller. This pressure might be considered high and could, thus, result in a recall; otherwise, if the pressure is very low, this factor could then favor the course of continuing business as usual. The other factors can also be thought of in terms of low and high values.

Business as usual**Business as usual****Figure 1.** Main Factors of the Decision for and against a Product Recall

The first and second determinants mark the evidence of small and big risks, i.e. the first represents the potential occurrence of personal injuries and damage in the household sphere of consumers. The consumer's risk may, secondly, become the seller's risk if the seller is considered responsible for the negative consequences of defective products. This, of course, involves the wide area of product liability law with its numerous interesting details which cannot be covered here. Depending on clear and diffuse evidence of smaller and bigger risks to the consumer, the seller's decision for or against a recall is plausible. The same seems to apply with regard to the liability risk of the seller. The decision to continue with business as usual will often be a decision valid for just the immediate period until the seller can obtain further facts to replace the former weak evidence. In other words: the seller requires further information via risk analyses in order to make to a sound decision in favor of or against a product recall.

The third and fourth determinant follow from the importance of the product and the reasonableness of the product user. "Importance" indicates the specific value of the product.

Suppose there is a drug with considerable risky side effects which nonetheless are unavoidable due to the drug's basic merits. Whether these side effects are tolerable (meaning "no recall") or intolerable ("recall") might be an open question in crucial cases, making it virtually impossible to deal with in the courts. Let us recall, for example, the drug VIOXX supplied by Merck, withdrawn from the market worldwide in 2004, and CELEBREX by Pfizer, a very similar drug which is still available but for which the company does not advertise.

The fourth determinant is the reasonableness of the product user (high/low). This factor indicates the fitness and will of the consumer to take care while using the product. With highly motivated and reasonable consumers suitable user manuals and additional instructions and warnings at the point of sale and via print and electronic media are sufficient to avoid recalls. Vice versa: Consumers who do not read or understand instructions, who do not take notice of public warnings and generally lack conventional care, will necessarily run considerable risks which may be reduced only by recalls. Of course, there is always the chance that such consumers remain totally unaware of public requests to return the defective product.

The next two determinants are the seller's market power and reputation on the one hand and his ability to perform a product recall on the other.

The latter marks the efficiency and costs of a product recall as well as the existence or non-existence of alternative actions. Let us commence with the alternative actions. Must there be a full-scale open recall or might a "silent recall" be appropriate? In the case of a silent recall, consumers are unaware of the recall; the defective product is repaired at the next scheduled maintenance, and the consumer remains unaware of it. Is a recall needed at all, or is an instructive warning sufficient to avoid users suffering injuries or, at least, to avoid the seller's liability for these injuries?

We will now turn to the efficiency and costs of a product recall. Efficiency refers to the well-known fact that even spending large sums of money will not ensure that 100% of the critical product quantity with injury potential will be returned to the producer. The quota of returned products, measured as part of the overall quantity recalled, seldom exceeds 60%. Abbott (1991, p. 106) reports an average quota of 55% with considerable variance, the data being provided by the US Consumer Product Safety Commission. Smith/Thomas/Quelch (1996, p. 11) state quotas of between 15 and 70% for automobile recalls. We may safely assume that the realized quota depends on the amount of money spent on the recall. The money is required for public notification, backward logistics, elimination of the product risks by repair or by exchange of a brand new product for the old one, providing special incentives, etc.

$$\text{Quota} = \frac{\text{actually returned quantity of risky products}}{\text{total quantity of risky products}}$$

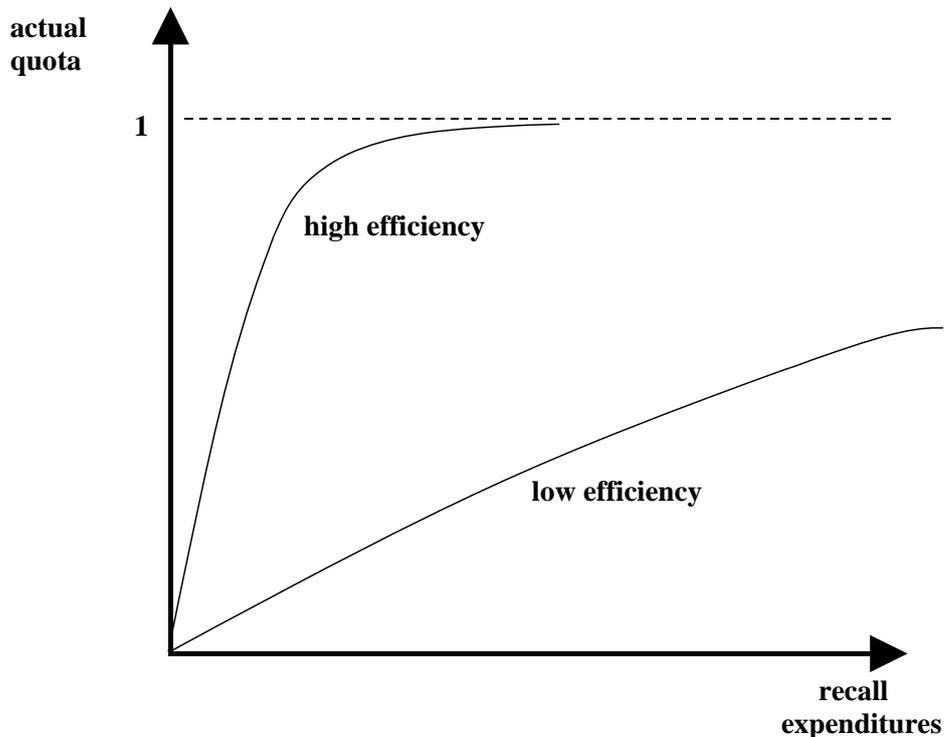


Figure 2. Recall quota as a function of recall expenditures

Suppose we plot the attained quota on the vertical axis and the money spent for a recall on the horizontal axis. The curve will obviously be a steadily increasing one with marginal increases that will become increasingly smaller with every unit of additional money. This curve is illustrated in fig. 2. We may safely assume an upper limit, i.e. a quota which will not be surpassed even by spending even higher sums of money. A product recall, then, is called efficient if a sufficiently high quota can be easily attained, that is by spending a low sum. Vice versa, a product recall is deemed to be less efficient if an acceptable quota cannot be attained despite unrealistically huge budgets. Then finally: The greater the efficiency, the more we should expect a product recall, and vice versa: with very low efficiency we have more reason to expect a continuance with business as usual.

How do the seller's market power and his reputation relate to the decision to recall or to continue with business as usual? Speculations here seem to be highly controversial. We may argue that the dubious behavior of monopolists would not lead to losses of market share in either case, simply because there are no competitors. The decision to recall equates to the seller's confession of having delivered defective and dangerous products. By deciding against a recall, the seller rules out any responsibility on his side, leaving all potential risks with the consumer. Which strategy is more harmful to the seller's reputation? The answer may be different, depending on whether the initial reputation is high or low. In the case of low reputation, this can hardly matter because there is nothing left to lose. The seller definitely has

something to lose if he has a high reputation, but we may expect a loss of reputation both with and without a recall a recall.

To complicate the reasoning even more, we may add further arguments. Due to the reputation of the seller, consumers will cease to attribute the risks to the product defect delivered by a seller with an excellent reputation. On the other hand: Sellers with such excellent reputations will try very hard to keep their reputation at a high level. And finally: consumers have high quality expectations for products of reputable sellers, and corrective actions like recalls in the rare cases of risk are simply part of these favorable expectations. People think positively of a seller who obviously takes care of his customers years after the sale. The seller thus behaves in a way that corresponds to his high reputation. Recalls, therefore, do not hurt reputation, but may even enhance and stabilize a company's excellent reputation.

We conclude tentatively that having a high reputation tends to lead to companies to favoring product recalls, discourages continuance with business as usual. And vice versa: With companies that have a low reputation we expect less recalls and more attempts to get on with business as usual.

The final determinants are the pressure built up by the media, public authorities and regulatory agencies on one side, and individual pressure, resulting from ethical and religious reasoning, on the other side.

3. So far, the main factors affect the decision for or against a product recall. My arguments, though plausible, are clearly speculative. This is especially true in the case of two factors which definitively require some further elaboration: market power/reputation on one hand and the time factor on the other.

Whether the high reputation of the seller will, all other conditions given, lead to more recalls and a low reputation to fewer, is basically an open question, requiring further discussion in a subsequent paper.

Now, the time factor is not explicitly present in fig. 1. Time nonetheless seems to be an important variable behind some factors of fig. 1. To find, for instance, clear evidence of consumers' risks and sellers' liability risks – our first two factors – requires time for risk analyses, time to postpone the decision for or against a recall to a later point in time.

Then: increasing the realized quota of products actually returned to the seller takes time: for instance, for several notifications, for the repair or exchange of defective products for new ones, etc. This concerns the factor of feasibility and efficiency.

Finally, and probably most importantly: the time span between the first weak signals of potential injuries and liability and the actual date when the recall is set in action seems to be a powerful indicator of responsible business behavior; at least, most consumers and customers think so. A short span is taken as a sign of responsible action - there is no delay or hesitation when the customers' welfare is at stake. The argument is equally convincing vice versa. The

time phenomenon should hence be of major importance behind the last two factors in fig. 1. The more time elapses between the first signal of a possible product problem and initiating a full-scale recall, the harder it is to find an acceptable reason for the late recall. The firm has to give convincing explanations for both the recall as such and the long period of hesitation. There may be no acceptable explanation for the delay. In this case, the seller might consider whether it is wise to start a recall at all at such a late point in time. We may conclude that both the reputation and the time factor seem to have strong influence on decisions for or against a recall, but the nature of this influence, even the sign (minus/plus) and its strength, is a question that is far from settled. Both factors, therefore, require further elaboration.

C Two Factors Revisited: Time and Reputation

1. Let me attempt such an elaboration by presenting a brief empirical study. This study is related to an analysis of John Mowen who, like myself, takes a special interest in product recalls. In actual fact, my study is a kind of remake of Mowen's earlier work; Mowen used a US sample that was hardly representative of the market place, whereas my data are representative for consumers in the Western parts of Germany.

We both regard consumers in situations when a product recall has actually taken place. We would like to find out why consumers react to different recalls in a different ways. Which factors are responsible for a very harsh reaction and which lead to an attitude of indifference? Please notice that we aim at the side effects of a recall; the decision pro recall has been made and the firm expects a considerable flow-back of defective products, the main effect. The side effects are variations of the firm's image. Image factors are very important for future sales. That is why we expect firms to take into account such factors while contemplating recalls.

2. Let me first present the design of my empirical analysis of German data.

The hypotheses of our research concern two main factors to govern consumers' reaction to product recalls. The first factor is familiarity of the consumer with the manufacturer's brand (branding factor, reputation): We expect less (negative) effects the more familiar consumers are with the manufacturer's brand. The second factor marks the time span between the first injury (detection of a defect) and the recall (timing factor). The length of time is closely connected with the number of injuries/accidents which may induce the manufacturer to finally urge a recall, and we expect more negative image effects the longer this time span is. The hypotheses can be easily derived – as Mowen shows – from thoughts developed in well-known attribution theories.

With regard to both factors, we discern only two states: Familiar vs. unfamiliar brand with a high and low reputation, respectively, and a long vs. a short time span.

We thus test our hypotheses in a full factorial design with four quasi-experiments, which are part of a larger survey on consumer behavior towards product risks. The part of the survey relevant here relates to bicycles and was performed in structured personal interviews. The random sample contained 487 persons over the age of 14 years and is representative for the Western part of Germany (see fig. 3).

Bicycle (n=487)	
Survey related to consumer behavior towards product risks (n=487)	
Familiar brand and time span of two weeks (n=120)	Familiar brand and time span of one year (n=119)
Unfamiliar brand and time span of two weeks (n=116)	Unfamiliar brand and time span of one year (n=132)

Table 3: Factorial Design with Four Quasi-Experiments

Figure 3. Factorial Design with Four Quasi-Experiments

Following Mowen, we choose four operationalizations of the manufacturer's image: sympathy, probability of buying the brand next time, the firm's engagement in consumer values and, finally, its demonstration of responsible conduct towards the customers' physical and financial welfare. The image factors were measured on a six point rating scale.

The tests of the hypotheses were performed by analysis of variance.

The analysis of variance explains the effect of independent variables upon one or more dependent variables. Does variation of the branding and timing factor exert a significant influence on the four image items? Are there any significant differences between the four sub-samples?

Independent Variable Dependent Variable	Branding Factor		Timing Factor		Interactions	
	F	F	F	F	F	F
Sympathy R ² = 0.092 y=3,1	0.01	0.9298	48.25	0.0001	0.11	0.7388
Buying Probability R ² = 0.056 y=3.8	1.36	0.2437	26.34	0.0001	0.66	0.4184
Consumer Protection R ² =0,117 y= 3.0	1.39	0.2392	60.92	0.0001	1.47	0.2263
Responsibility R ² = 0.027 y=4.1	0.1	0.7462	8.42	0.0039	4.66	0.0314

Figure 4. Analysis of Variance

Figure 4 presents the results of the analysis of variance, with y indicating the mean of the ratings and R² the degree of correlation. The analysis does not use available demographic and psychographic information. This will be done in a later paper.

The table shows for each factor-branding factor, timing, factor, and the interactions formally taken as a third factor – and for each image item the F-value, i.e. explained variation divided by not-explained variation. The reader will notice at once the high F-values of the timing factor and the comparably low F-values of the branding factor, and the interactions in the third column.

Testing the F-values, we assume that the factor does not exert any influence at all. Rejecting this hypothesis in case it is true, leads to an error of type a. A high a means that the non-influence hypothesis cannot be rejected. A low a leads to the opposite inference: The non-influence hypothesis has to be rejected, and we conclude that this factor exerts a significant influence. Fig. 4 shows that the timing factor with an a-value below .05 exerts a significant influence, but that the branding factor does not.

3. These principal findings differ fundamentally from Mowen's results. In his analyses of 1979, Mowen detected for both branding and timing significant effects upon the first three image items, i.e. sympathy, buying probability, and consumer protection, but no significant effect on responsibility.

In another analysis, (ref. Mowen, J.C.; Jolly, D.; Nickell, G.S., 1980) used a stepwise regression approach. They asked consumers about their "perception of the company" with respect to four well-known manufacturers who had carried out recent recalls, and found no significant effects of the timing factor. We may summarize the analyses of US and of German data in fig. 5.

	USA	Germany
Brand	++	/
Time	?	++

Figure 5. International Comparison

Another difference seems to be even more important. The branding factor has no significance in my analysis, but seems to be significant in US data. Specifically, Mowen demonstrates for US data that consumers grade the responsibility for product defects in the case of well-known brands higher than in cases of unknown manufacturers. There is no corresponding observation in German data.

D Outlook

Let me close with some managerial implications.

First, the familiarity and reputation of the recalled product or the recalling firm does not seem to be that important for image effects as the marketers used to think. Our analysis leads to the conclusion: A high reputation does not insure against image-losses. We may even go further: If well-known and less-known manufacturers are equally involved, then the highly reputed firm is stricken even harder. Its reputation is at stake.

Second, we may have to point to the central importance of the timing factor. The time span between first detection of defects and injuries and the recall can hardly be overrated. This finding indicates the rather special type of the recall decision.

Obviously, the recall must be arranged at once (or, at least, very fast) or not at all. A late decision in favor of a recall is – at least with respect to the manufacturer’s image – devastating. Recall decisions, thus, are typically decisions under extreme time pressure. A deferral tends to increase the image costs of a later recall dramatically. The recall decision, thus, turns out to belong to the type of “now-or-never” decisions without ample time for a thorough consideration of all aspects of the decision.

A final remark pertains to the negative sign of the image-shift. There is some speculation in marketing management about positive shifts due to a recall. Reference is made to people who confronted with a product recall develop feelings of satisfaction and gratefulness towards a manufacturer taking so much care for his products after all these years. Unfortunately, there was no statistically significant evidence for this kind of feeling in our data.

Further research is needed to settle the dispute about relevant factors and to explore the obvious differences between US and German data. We expect insights from a more detailed analysis of variance for different consumer segments formed along demographic and psychographic variables. We thus might examine both the branding factor and the timing factor for consumers with different risk perception and/or strive for safety. Without these insights, the outlook regarding managerial implications of our analysis must be of a preliminary nature.

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