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HOW TO BE SUCCESSFUL IN IMITATION MANAGEMENT?

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ABSTRACT - **There is often a clash between the necessity to innovate and the high economic risks involved in the introduction of novelties. The technology-strategies developed in reaction to this situation aim at profiting from the technological leader's or the innovator's experience: the technological follower or imitator enters a market in which the main features have already been developed. An empirical investigation of 66 firms shows that imitation projects are only successful if one succeeds in realizing a high imitation degree and in impeding the market entry of further imitators. Further development or an improvement of the innovation (a low imitation degree) does not affect the imitation success in a positive way. Furthermore, an imitator should be anxious to deteriorate the conditions of market entry for strong late-comers and prevent further imitators from market entry. Further more the results show that successful imitation management has at its disposal technology, intelligence, marketing and production potentials for overcoming existing imitation barriers in which a differential control and coordination of the individual potentials is strictly necessary.**

KEYWORDS - **Technology management, imitation, technology strategy, imitation success**

INTRODUCTION: THE "INNOVATOR-IMITATOR-DILEMMA"

The enormous importance of technological innovations for companies' long-term success has already been analyzed in detail in many investigations. It has been shown that it is of essential importance for companies to secure their ability to compete by improving their production and manufacturing technologies as well as by developing new products and markets. Imitation of Innovation, on the other hand, is often judged negatively. As far as imitations on the level of manufacturing are concerned, even empirical studies used to propagate the innovator's role as the promising one in contrast to the imitator's role [31], [15], [12], [41]. Some aspects of imitation, however, are judged positively. The necessity of the rapid spread of technological progress, as a guarantee of economical growth, has lead to an attitude which regards imitation as necessary [2]. The high risks involved in innovative projects are a second important aspect which, at least from the point of view of firm policy, contributes to a positive attitude towards imitation. That is, a company can become active as a technological follower or imitator in a market in which the main

features have already been developed. Investigations have shown that such a strategy can be connected with the utilization of specific imitation advantages: Schwartz [35] found that innovators have higher costs in developing products and in opening up the market in comparison to imitators. The imitation costs are only 60 % of the innovation costs. This favorable cost situation is also emphasized by Mansfield [27]. A study by Bischoff [8] gives a differentiated idea of this. According to this study, imitation costs are 61 % of innovation costs in the area of market research, 49 % in the area of development, 71 % in the area of marketing, and 84 % in the area of sales. The imitator has average costs amounting to 72 % of the innovators's. The results of Schnaars [34] deal with cost advantages which an imitator can achieve by learning from the errors of the innovator.

Those utilizing such advantages, however, face some risks specifically resulting from the fact that the imitator enters the market at a later time. What effect might this entry at an advanced point of time in the product life-cycle have? The technology-leader could already have established himself on the market as a potent market leader. The technologically orientated market leader is already in a position to gain special experiences; of creating customer loyalties and/or of setting technological standards.

A technologically orientated firm has to decide whether to make use of imitation advantages or to become active on the market only if it can establish itself as an innovator. This situation can be described as the "innovator-imitator-dilemma". This dilemma situation includes the question regarding organization of successful innovation and imitation management. The latter is the subject of our investigation.

In general, even the most current research on imitation management leaves much to be desired. In particular, there often is no empirical validation of acquired information. It is true that since the publication of Ansoff/Stewart's [4] fundamental work, imitation - and especially the aspect of timing - is generally acknowledged to be one of the options of strategic management of technology [20], [40], [26], [13], [30], [43], [32], [29], [9]. What must be regarded as particularly problematic is that decision aids for the choice of a strategy are provided only in very rare cases. It cannot be our aim in this article to deduce decision aids for all strategic options. We concentrate on the strategy of imitation, which has up to now received little attention. However, we will not restrict our analysis of this strategy to the timing of market entry, but try to show which capabilities a firm must have if it is going to successfully carry through an imitation strategy. This article therefore goes beyond the mere consideration of the leader-follower problem. Besides the goals set by the imitator, we are going to analyze the way in which activities of imitation management can be designed to fit in with the given situation.

THEORETICAL BASIS: THE IMITATION MANAGEMENT MODELL

The starting point of our consideration is the innovator's and imitator's competition situation. The innovator, as the first one on the market, wants to maintain the resulting monopoly as long as possible. Consequently, an innovator will try to impede the appearance of imitators on the market by barriers-to-entry. Therefore, a successful imitator must be able to overcome barriers established by the innovator. Hereafter, we will call these capabilities "imitation potentials".

We are dealing by definition with technologically new products. Therefore, once the decision to imitate has been made, an imitator must have certain technological capabilities in order to imitate an innovation. The necessity to procure technological know-how as a guarantee for imitation success is underlined by Fischer [18]. Fischer argues that the imitator's formost task is to overcome or avoid, by means of technology, the imitation barriers caused by patent rights. Zörgiebel's [43] findings are that an imitator can be successful if he achieves a high degree of technological competence. Bental/Fixler [7], too, underline the necessity of the existence of technological potential.

Assuming that an imitator enters the market a certain span of time after the innovator, and assuming that there is a classical product lifecycle, it follows that the imitator enters the market in a period of strongly increasing sales. If the imitator wants to master this situation successfully, he has to be able to cope with the increasing sales volume by adapting the production. In other words, he has to be able to secure "production potential". Again, it is observable that large size is an advantage, especially if the cost degression resulting from large-scale production is taken into account [39], [36], [17]. In this context, it is interesting to consider the findings of Schnaars [34], according to whom an imitator has an advantage over the innovator if he has a high production rate and low per-unit costs.

We will denote an imitator's capability to develop a new market as "marketing potential". This includes abilities related to marketing instruments and the ability to notice customer needs. A third criterium which may not be neglected in this context are size advantages of a company's marketing department. In their theoretical analysis, Baldwin/Childs [6] describe marketing capabilities as decisive for the success of the so-called "Fast-Second Strategy". In particular these include the imitator's market share in adjacent markets, the existing distribution system and the effectiveness of the marketing activities. Kaufer [21] comes to quite similar results. He assigns a decisive role in the process of shaping market structures to the innovator's and possible imitator's potential for market penetration. Schnaars [34] empirically confirms these considerations. Closeness of client relations and success in opening up and ascertaining adequate distribution channels can be identified as criteria relevant to success. In his empirical study, Albach [1], too, underlines the importance of marketing activities in establishing close client relations as a guarantee of imitation success. In this context, one can easily imagine size advantages that result from the existence of an efficient sales system or from good knowledge of customer potential due to

high market shares in adjacent markets.

Going beyond the mere aspects of imitation development and opening of markets, it should stated that in addition to the presence of technology, production and marketing potentials, there has to be an early initiative or an impulse for imitation. A potential imitator can not only receive such imitation impulses from the market, he also has to observe the respective changes in the technical state-of-the-art, at least as far as his own or adjacent technological fields are concerned [4], [7], [24]. In other words, the imitator must secure an "intelligence potential" which covers relevant markets as well as relevant technologies. The importance of this intelligence potential has already been underscored by Levitt [25]. He advocates non-stop scanning for possible subjects for imitation as absolutely necessary for long-term success. According to Levitt, the intelligence function should be assigned to the R&D department as its central task. The R&D department would then be assisted by the marketing department, which would continously carry through competition analyses regarding the success of new products.

These imitation potentials derived are therefore aimed at three quantities of results of the imitation management:

- The "imitation degree": as an indicator of the capability of a company to imitate an innovative product with respect to technology and application. These activities aim at imitating an innovative product in such a way that the imitation for the most part makes use of an identical technology, and that the possibilities of usage and application of the imitation correspond, for the most part, to those of the innovation. It is only if these two aspects are taken into consideration that the imitation product will be regarded by the user or customer as an equivalent imitation of an innovation, and it is only then that the imitator can profit from specific advantages of the situation of imitation.
- The "building up of follower barriers": as an indicator of the ability of a company to make market entry more difficult for other imitators. We assume that an imitator will only be successful if he succeeds in impeding further imitators from market entry.
- The "imitation success": as an indicator of the satisfaction of an imitator in reaching his imitation targets, especially his market targets.

These considerations lead us to the model of our investigation (figure 1). The independent variables of our imitation management model are the imitation potentials, and the dependent variables are the imitation targets. Relationships among the independent variables and among the dependent variables might also be possible.

EMPIRICAL DESIGN

The starting point of the empirical analysis of successful imitation management is the innovative company. We investigated innovation projects promoted by the minister for economic affairs of the Federal Republic of Germany. This promotion program lasted from December 1971 until July 1981, so we can assume that most of the projects were already in the stage of realization and application in 1988, the time of our survey. We were able to study 92 promoted companies with respect to the appearance of possible imitators. The innovation projects analyzed do not belong to the area of typical consumer goods. More than 50 % of the firms analyzed are mechanical and electrical engineering firms.

Figure I

The imitation management model

Table 1 gives a survey of the hypotheses upon which our model is based.

Table I

The deduced system of hypotheses

Hypothesis 1:
The more pronounced the imitator's intelligence potential is, the higher the imitation success.
Hypothesis 2:
The more pronounced the imitator's technology potential is, the higher the imitation success.
Hypothesis 3:
The more pronounced the imitator's production potential is, the higher the imitation success.
Hypothesis 4:
The more pronounced the imitator's marketing potential is, the higher the imitation success.
Hypothesis 5:
The more pronounced the imitator's technology potential is, the higher/lower the imitation degree.
Hypothesis 6:
The more pronounced the imitator's intelligence potential is, the higher the imitation degree.
Hypothesis 7:
The more pronounced the imitator's marketing potential is, the higher/lower the imitation degree.
Hypothesis 8:
The more pronounced the imitator's technology potential is, the more/less follower-barriers can be raised.
Hypothesis 9:
The more pronounced the imitator's marketing potential is, the more follower-barriers can be raised.
Hypothesis 10:
The more pronounced the imitator's production potential is, the more follower-barriers can be raised.
Hypothesis 11:
The higher the imitation degree, the higher/lower the imitation success.
Hypothesis 12:
The higher the imitation degree, the more/less follower-barriers can be raised.
Hypothesis 13:
The stronger the follower barriers building by the imitator, the higher the imitation success.

It was the innovators who identified imitators. A competitor was classified as an imitator if the following criteria applied to him:

- the competitor must have entered the market after the promoted innovator,
- the technologies of innovation and imitation must be judged as similar for their most part,
- the possibilities of application of innovation and imitation must be judged as similar for the most part.

In 45 cases imitators could be identified. In 33 of these cases we succeeded in making an interview regarding the progress of the imitation process. The 66 interviews resulting from the 33 investigation pairs serve as the basis for our causal analysis of successful imitation management.

We are going to put to the test the specified and operationalized system of hypotheses of our imitation management model with the help of a LISREL approach. Table 2 gives a survey of the respective measurement-variables.

Table II

Measuring instructions of the analyzed variables

Factors/Measuring Variables	Measuring Instructions
Intelligence Potential (KSI_1):	
- Competitor Analysis (X_1)	The implementation of a competitor analysis by the imitator.
- Patent Analysis (X_2)	The implementation of a systematic patent analysis by the imitator.
- Demand Analysis (X_3)	The implementation of a systematic demand analysis by the imitator.
Technology Potential (KSI_2):	
- R&D Capability (X_4)	The strength of the r&d capability of the imitator (evaluated by the innovator).
- R&D Importance (X_5)	The importance of r&d activities for the imitator's success.
- Technology Leader (X_6)	The frequency of the imitator being first on the market in the past.
- Technological Experience (X_7)	Wether the imitator is familiar with the relevant technologies.
Marketing Potential (KSI_3):	
- Market Know-how (X_8)	The importance of the fact that the imitator's market knowledge is responsible for the imitator's success (evaluated by the innovator).
- Distribution System (X_9)	The importance of the fact that the imitator's distribution system is responsible for the imitator's success (evaluated by the innovator).
- Marketing Capability (X_{10})	The strength of the marketing capability of the imitator (evaluated by the innovator).
- Market Share (X_{11})	The importance of the fact that the imitator has a large market share in adjacent markets.
Production Potential (KSI_4):	
- Production Capability (X_{12})	The strength of the production capability of the imitator (evaluated by the innovator).
Imitation Degree (ETA_1):	
- Application (Y_1)	The degree of similarity of imitation and innovation with regard to usage and application.
- Technology (Y_2)	The degree of similarity of imitation and innovation with regard to the technology.
Imitation Success (ETA_2):	
- Target Achievement (Y_3)	The degree of satisfaction of the imitator in achieving his imitation targets.
Follower Barriers (ETA_3):	
- Technological Followers (Y_4)	Wether there is a technological follower entering the market after the imitator.

The parameters are estimated by the method of "Unweighted Least Squares" (ULS). The calculated reliability coefficients of the model adopt valences between zero and one for all exogenous and endogenous variables. The total model explains 88.5 % of variance (Goodness-of-

Fit-Index). The Q-Plot, plotting the normalized residuals against the quantiles of normal distribution, also shows the suitability of the model.

RESULTS

Figure 2 presents the results of the parameter estimate of our causal analysis using a LISREL-model.

Figure II

Path diagram of the standardized solution of the parameter estimate

In order to analyze in detail the causal relationships shown in the structural model, the individual effects have to be decomposed. Table 3 shows the strength of the direct, indirect, and total causal effects of our imitation management model.

Table III

Causal effects relating exogenous and endogenous latent variables

Causal effect		Direct effect	Indirect effect	Total effect
of	on			
Technology potential	Imitation Degree	-0,86	--	-0,86
Technology potential	Follower Barriers	-0,51	-0,14	-0,65
Technology potential	Imitation Success	0,42	-1,00	-0,58
Intelligence potential	Imitation Degree	0,55	--	0,55
Intelligence potential	Follower Barriers	--	0,09	0,09
Intelligence potential	Imitation Success	0,58	0,40	0,98
Marketing potential	Imitation Degree	0,13	--	0,13
Marketing potential	Follower Barriers	0,27	0,02	0,29
Marketing potential	Imitation Success	0,24	0,29	0,53
Production potential	Imitation Degree	--	--	--
Production potential	Follower Barriers	0,44	--	0,44
Production potential	Imitation Success	0,03	0,31	0,34

Checking of the hypotheses on influences on "imitation success": The "intelligence potential" has the strongest positive influence.

Incontrovertibly, the "intelligence potential" has the strongest positive influence on "imitation success". This enormous relevance of intelligence activities to success is confirmed in Levin's [24] empirical study. Similarly, Ansoff/Stewart's [4], Levitt's [25] and Bental/Fixler's [7] descriptions of strategies for successful imitation management all assign a decisive role in ascertaining imitation success to the imitator's intelligence activities/capabilities.

Testing of causal hypothesis 2, which postulates the influence of "technology potential" on "imitation success", does not yield similarly unequivocal results. In this case we assumed a positive relation, which, however, can only be maintained if we exclusively observe the corresponding direct causal effect. The total effect, on the other hand, is strongly negative. One possibility of explaining this contradiction with the relation we postulated is that the positive direct effect of technology potential describes the capability of an imitator to overcome barriers of technological complexity induced by the innovation. A certain amount of technological potential would consequently be necessary to be successful as an imitator. But on the other hand, the usage of "technology potential" seems to involve the risk that the imitation goal is progressively lost, and that it is not only attempted to imitate the innovation, but also to develop it further. Consequently, the product is no longer an imitation having similar product characteristics as the innovation, but an improvement innovation with new product characteristics. It is then probable that there are "teething pains" as well as difficulties connected with the opening up of a market for the improvement innovation. The target, "development of an improvment innovation" leads to a drastic prolongation of the development time. This would then be incompatible with the "Fast-Second"-strategy [6], [18], [26], since it leads to an unneccessary prolongation of the innovator's monopoly period, so that important imitation advantages cannot be made use of. There is also the risk that other competitors could try to imitate the improvement innovation, whereby they might eventually make use of imitation advantages to the detriment of the improving innovator. This explanation is supported by the works of Ansoff/Stewart [4], Freeman [20], Maidique/Patch [26] and Dasgupta [14], who assume that successful imitations are generally characterized by lower R&D expenses compared to the innovations. The imitator's technological activities must be limited to overcoming the technological complexity barrier induced by the innovation, for it is only in this way that imitation success can be assured. Consequently, we must modify our causal hypothesis 2, now assuming a reversed, u-shaped curve for the relation between "technological potential" and "imitation success". A certain amount of technological potential is a neccessary condition for success, because the existing technological complexity must be overcome. R&D activities going beyond this aim, however, often have a negative effect on "imitation success". For an imitation to be successful, technological experience and competitiveness of the R&D department, as well as the firm's innovative atti-

tude in general, must not lead to the development of technologically complex and expensive improvement innovations.

Our causal hypothesis 4 assumes a positive correlation for the causal relation, "marketing potential" - "imitation success". The results of the parameter estimate do not contradict this. With respect to the total effect, "marketing potential" is the imitation potential with the second strongest influence on "imitation success". Our findings are thus in accord with those of numerous other empirical studies [42], [41], [3], [37], [22], which assign to "marketing potential" a decisive role in entering - as a follower - a market which has already been opened up. In this case, a good knowledge of the market or a high market share in adjacent markets, as well as the efficiency of the sales department and the marketing activities are the most prominent factors for assuring a successful market entry.

Finally, we also assumed a positive causal relation between "production potential" and "imitation potential". The results of our LISREL modelling have, however, caused us to qualify this positive relation. As an isolated independent aspect, production potential does not have any causal influence on "imitation success". A positive causal effect can only be observed if activities the production area are successful in preventing other potential imitators from entering the market. When this result is compared with the findings of relevant publications [23], [42], [16], it can be observed that capabilities connected with production technique have a high relevance to success in those cases where the firm succeds in profiting from size advantages, in that such advantages act as barriers to entry for late imitators. The mere existence or usage of "production potential" does not necessarily lead to "imitation success". The decisive point appears to be the objective of its usage. In addition to coping with problems of production technique the imitating firm must attempt, through its size advantage, to bar other imitators from entering the market.

Causal hypothesis 11 assumes a positive or negative causal relation between "degree of imitation" and "imitation success", causal hypothesis 13, a positive relation between "follower barriers" and "imitation success". Our results permit us to maintain both hypotheses and to modify causal hypothesis 11 by stating more precisely that the causal relation is a positive correlation, in other words, the higher the degree of imitation, the higher the degree of success of the imitation. Both of these results are in accord with other empirical studies [38], [34]. Thus, the relevance to success of a high "degree of imitation" with simultaneous construction of follower barriers is an important starting-point for designing a "Fast-Second Strategy" as a strategy of successful imitation management, like the ones described by Ansoff/Stewart [4] or by Baldwin/Childs [6]. A successful imitator must try to develop a product that possesses product attributes similar to those of the innovation. This development process must be carried through speedily. Furthermore, the imitator must try to impede other imitators' entering the market in order to remain the only imitator on the market for as long as possible.

Testing of the hypotheses on factors influencing the "degree of imitation": The "intelligence potential" has the strongest positive influence.

Only by making use of "intelligence potential" and "technology potential" can the degree of imitation actively be changed. The modification indices calculated within the frame of a parameter estimation confirm the model structure opted for, i.e. there is an important causal correlation.

A very strong positive effect has been observed for "intelligence potential". A firm can try to develop a product imitating an innovation to a high degree only when the technical and usage-related product attributes of the innovation are known. This result, then, confirms the obvious. Ansoff/Stewart [4] use the term, "superior competitive intelligence" in this connection. Similar ideas are to be found in Baldwin/Childs [6] and Maidique/Patch [26]. It is the strong positive effect of "intelligence potential" on the "degree of imitation" which is finally responsible for the high relevance to success of "intelligence potential". Analyses of competitor activities, demand structure and systematical patent investigations make a high degree of imitation possible and thus contribute to a successful termination of the imitation process.

For the influence of "technology potential" on the "degree of imitation" our findings show a negative correlation. The findings are thus in accord with those empirical studies which regard firms having a high technological potential as innovators or improvement innovators rather than imitators. For example, Buzzel/Gale's [10] findings, based on PIMS data, were that 70 % of the firms who had a high technological potential appeared on the market as innovators, not imitators. Firms which command a large amount of technological experience, which have an efficient R&D department, and which have often been "first" on the market with a technological innovation, will hardly content themselves with producing a mere imitation. Even if the impulse for development was a competitor's activities, and even if the firm has decided to develop a similar technologically complex product, the firm will be tempted, by its own technological competitiveness, to distinguish itself in the technological area even through its imitation. The firm will therefore attempt to develop an improvement innovation rather than a mere imitation.

Testing of hypotheses on influencing "follower barriers": "Production potential" has the strongest positive influence.

Again, the basic causal hypothesis for this portion was the assumption that all imitation potentials have some kind of influence on the variable "follower barriers" despite of the intelligence potential. The modification indices calculated by the LISREL-analysis confirm this decision. The corresponding element of the GAMMA modification matrix has a valence of 0.006. For the other imitation potentials an influence can be observed.

For the influence of "technology potential" on the variable, "follower barriers" our findings

show a strong negative correlation only. This applies to the direct as well as the total causal effect. These findings can be explained by conclusions similar to those related to the "degree of imitation" and "imitation success". A competitive "technology potential" has the effect that the "degree of imitation" of the imitating product is comparatively low. The firm will try to improve the innovation, not only imitate it. One effect may be that incentives are created for other competitors to imitate the improvement innovation, eventually without it being possible for the improvement innovator to seek a patent. For these reasons, we adhere to the findings of Orr [28], who states that technological capabilities do not seem to be suited instruments for constructing "follower barriers", even if the possibilities of patent law are made use of.

Our findings also show that there is a positive influence of "marketing potential" on the construction of "follower barriers". Market induced barriers to entry for further imitators can be constructed by establishing efficient and firmly rooted distribution channels or activities on adjacent markets, or by efficient marketing [42], [3]. The possibility of constructing "follower barriers" with the help of "marketing potential" contributes to the explanation of the fact that "marketing potential" has a positive influence on "imitation success".

However, "production potential" plays the decisive role in constructing "follower barriers". This potential has the strongest causal effect on "follower barriers". It seems reasonable to assume that size advantages that are made use of will serve well as barriers to entry [23], [39], [17]. In this context, it is interesting to note that a positive influence of "production potential" on "imitation success" can only be observed if the firm succeeds in constructing "follower barriers" with the help of efficient "production potential".

Finally, the "degree of imitation" only has a very small positive effect on the variable, "follower barriers". Products which are very similar to the innovation can hardly be used to prevent competitors from entering the market. The situation, "there are already at least two firms established on the market", hardly ever acts as a deterrent for firms planning to enter the market.

IMPLICATIONS FOR SUCCESSFUL IMITATION MANAGEMENT

Our results show that imitation projects are only successful if one succeeds in realizing a high imitation degree and in impeding the market entry of further imitators. Further development or an improvement of the innovation (a low imitation degree) does not affect the imitation success in a positive way. Furthermore, an imitator should be anxious to deteriorate the conditions of market entry for strong late-comers and prevent further imitators from market entry. When an imitator succeeds in building up follower barriers he only has to enter into competition with the innovator and not with further imitators. Consequently imitation management has to concentrate on activities through which both sub-targets of the imitation success - the imitation degree and the building-up of follower barriers - can be realized.

If we consider only the total causal effects which influence "imitation success", we receive a very simplified, but also very vivid image of the phenomena (figure 3).

Figure III

Total Effects in the imitation management model

This aggregated description makes it clear that there are two management problems in particular which imitation management must solve in order to be successful.

It is true that "intelligence potential" and "production potential" have a positive causal relation to "imitation success", but, on the other hand, there is a negative correlation between these two imitation potentials themselves. The effect of this correlation might be that the positive impulses cannot be put in action in their totality. Successful imitation management must make sure that existing capabilities and possibilities of production technique do not lead to a situation in which activities of analyzing competitor activities and market structure are neglected. Conversely, imitation management must also avoid failure to develop necessary production capacities, as a result of constant analysis of relevant markets and competitors.

The problem which is probably decisive for successful imitation management arises when the "technology potential" is put to use: technological capability is without a doubt essential in order to cope with the technological complexity induced by the innovation. But it can also lead to a situation in which the sub-target "high imitation degree" cannot be realized and one tries to create a new innovation instead. This problem is likely to occur if an imitator generally works in a highly technologically orientated way and has often already been an innovator. In such a case the target of the R&D department is that an imitation rather becomes an innovation. In this way, one risks neglecting to build up follower-barriers. Successful imitation management must aim at acting as a brake on the activities in the R&D department, a requirement which can often bring about loss of motivation.

An efficient and competitive R&D department will always endeavor to distinguish itself by its activities. Hence, mere imitation cannot be this department's objective. The team will tend to develop a complex improvement innovation rather than a mere imitation. The consequences are that development times are prolonged, new technical problems arise etc.; and finally "imitation success" becomes "innovation success".

When there is a competitive "technology potential", which certainly has to be judged positively with a view to the rapid overcoming of the technological imitation barrier, then it must be the task of successful imitation management to check the activities of the R&D department. In particular, there must be clear, pre-defined imitation targets and someone must see to it that they are followed closely. It must be avoided that, once the imitation is successfully carried out, the project runs on instead of moving into the marketing phase. If strategic considerations result in

the conviction that a mere imitation does not promise success and that one should therefore instead try to develop an improvement innovation, then this must be put forth as the objective of the project. If an improvement innovation is developed, innovation management activities must be reinforced. But these activities will only take place if the management is conscious of the innovative character of the development project. It is no problem to simultaneously carry through innovation projects and imitation projects in the department of technology management, with a view to their respective chances for success. But there may be no doubt about the target, because only then can suitable management activities be taken.

The application of technological potential is accompanied by the application of the intelligence potential. This is not limited to the starting phase of an imitation process but is also used in its continuing progression to exploit external information necessary for the imitator.

The sub-target "building up follower barriers" can be achieved through the use of marketing and production potentials. Especially the production potential, which has an almost insignificant direct influence on the imitation success, becomes a cornerstone for the imitation success when it comes to building up follower barriers. A central role in this connection is the marketing potential. Besides the capability of building up follower barriers it has a significant influence on the imitation success. A successful imitator must be in a position to develop a large demand volume.

The result shows that successful imitation management not only means "reproducing" an innovation. Rather, a system of already present imitation potentials must be applied, which is why differentiated control and coordination of the single potentials is indispensable. It is only in this way that it is assured that the imitation targets do not get lost and that the imitation therefore becomes a success.

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Figure I

The imitation management model

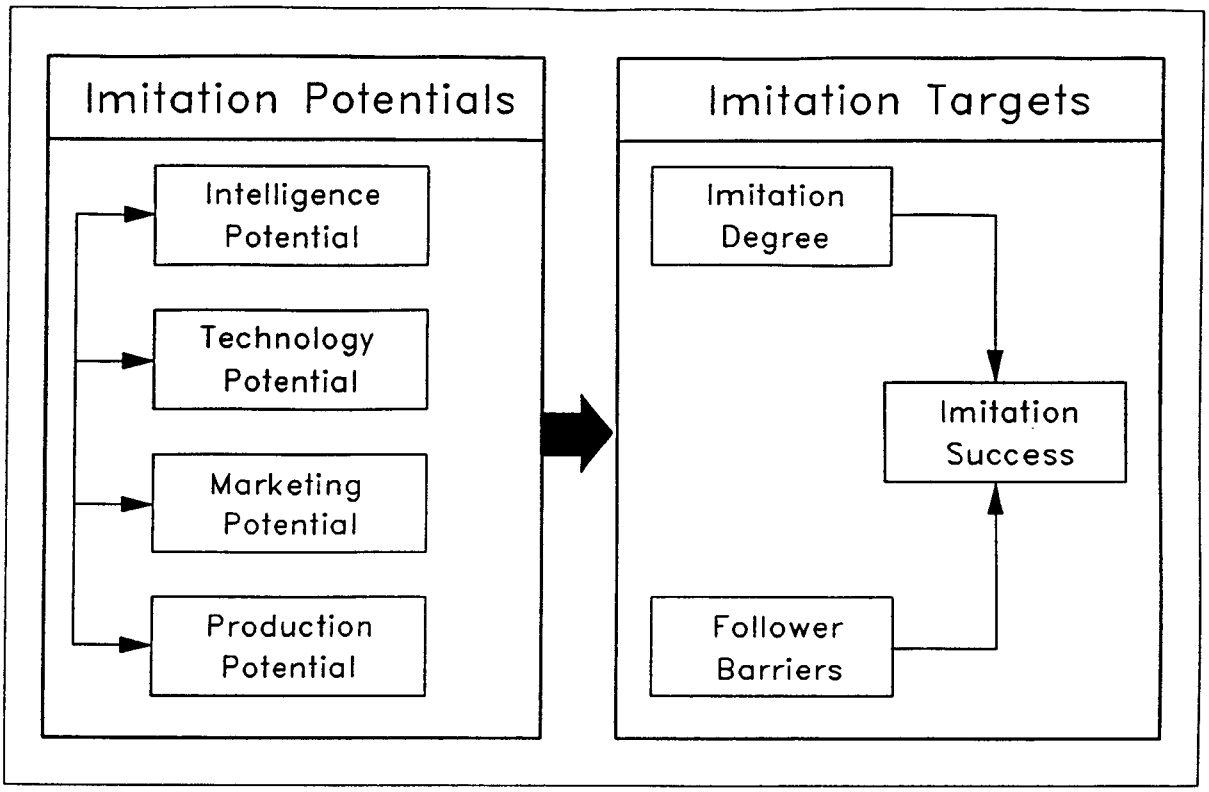

Figure II

Path diagram of the standardized solution of the parameter estimate

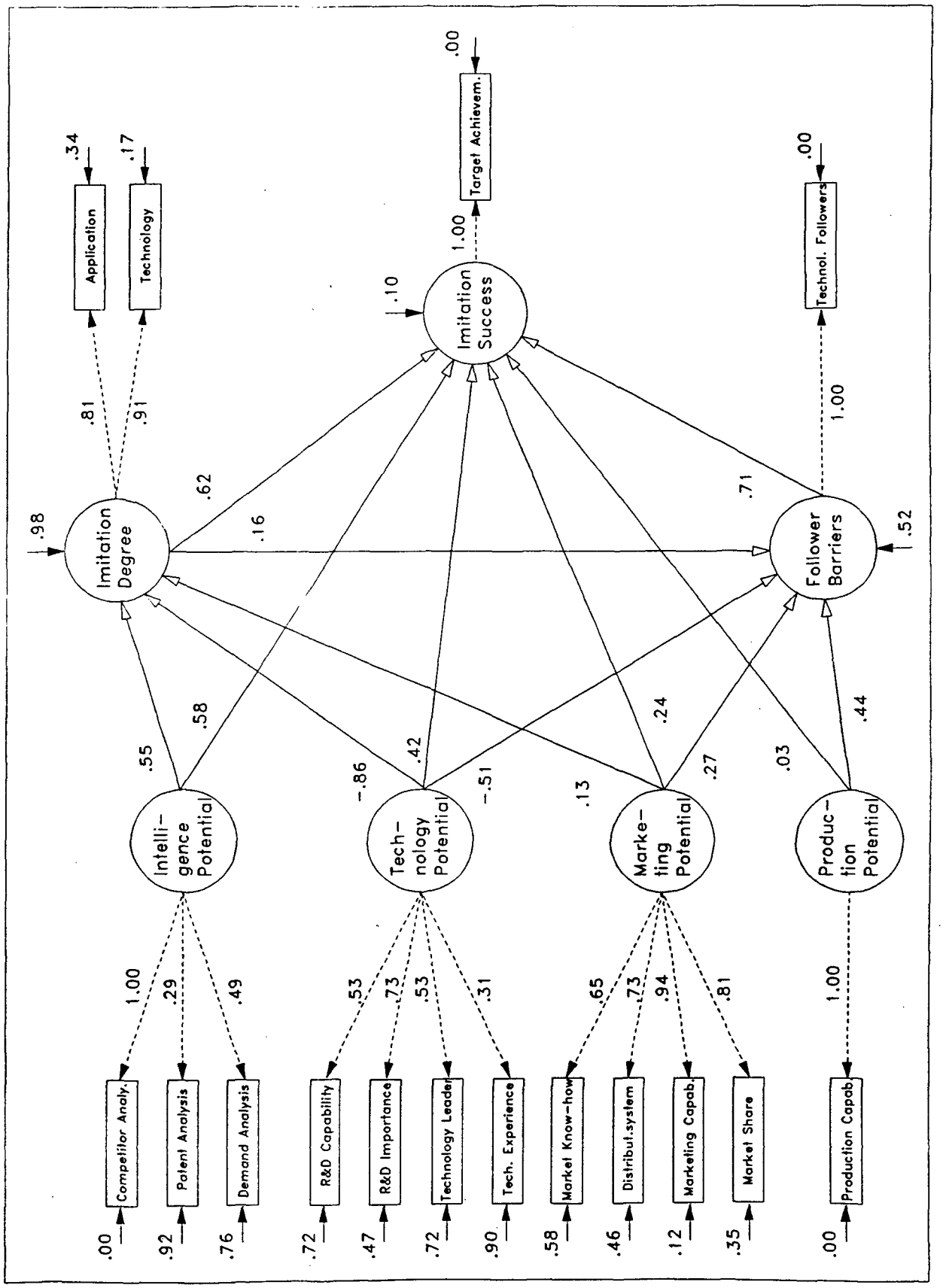

Figure III

Total Effects in the imitation management model