A knowledge-based SWOT-analysis system as an instrument for strategic planning in small and medium sized enterprises

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Abstract

Good performance within a company is the result of correct interaction of business management with its internal and external environment. The recognition of internal strengths and weaknesses, as well as external opportunities and threats, takes place on the basis of a SWOT-analysis. However, despite their importance, many companies often only have vague ideas of their competitive strengths and weaknesses, opportunities and threats. In this paper, the development of a knowledge-based system is described that can assist managers of small and medium sized companies in performing a SWOT-analysis. For our research purposes, we concentrated only on the identification of internal strengths and weaknesses. © 1999 Elsevier Science B.V. All rights reserved.

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1. SWOT-analysis as a part of the strategic planning process in small and medium sized businesses

1.1. Strengths, weaknesses, opportunities and threats

Every company is confronted with a variety of internal and external forces which, on the one hand can comprise potential stimulants, or on the other hand can compromise potential limitations as regards the performances of the company or the objectives the company wishes to achieve.

As a first step in the development of a strategic planning system, business managers should therefore commence with the identification and evaluation of these strategic factors which assist or hinder the company in reaching its full potential. Because every company is confronted with a dynamic environment, the relative importance of a strategic factor will change constantly, so this analysis is accordingly to be of a permanent nature.

This list of strategic factors can be used as a point of departure for the actual strategic plan within a small or medium sized enterprise. It is a flexible instrument. The greatest advantage is that it helps managers of small and medium sized enterprises survey the different management areas, gain insight into the significance within the framework of the company, and accordingly initiate suitable actions.

Good performances within a company are the results of correct interaction of business management with its environment. This environment can be of either an internal or external nature.

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To operate successfully in this respect, the company must concentrate its future objectives on its strengths, while averting tendencies related to the companies weaknesses. Responding to internal strengths and weaknesses is therefore an essential component of the strategic management process [4]. But success can only be achieved in this respect to the extent that one is familiar with the opportunities and threats resulting from the external environment.

The recognition of the internal strengths and weaknesses, as well as external opportunities and threats, takes place on the basis of a study, also called a SWOT-analysis. Here SWOT stands for ''strengths, weaknesses, opportunities and threats''. No standard list of crucial factors which apply for all companies exists because of the specificity of this set.

Within the framework of this study, however, we chose to concentrate solely on the internal business environment. This therefore only concerns the identification of strengths and weaknesses.

Strengths thereby relate to the competitive advantages and other distinguishing competencies which can be exploited by the company on the market. A distinguishing competence is something which can be done very capably by a company [7]. Weaknesses, on the other hand, are limitations which hinder the progress of a company in a certain direction.

1.2. The place of the SWOT-analysis in the strategic management cycle

Strategic management can be considered as a collection of decisions and actions taken by the business management in consultation with all levels within the company to determine the long-term activities of the company. The results striven for here primarily concern an improvement in the competitive position, the realisation of profit growth in the long-term, with as a result the achievement of better returns from the capacity utilised. Results of a secondary nature can also be striven for, which depend on the specific situation of the company.

Strategic management includes three basic elements, namely [3]:
· the formulation of a strategy;
· the implementation of a strategy;
· the control and evaluation of the strategy.

Before proceeding to these stages a thorough analysis of the companies internal and external environment must first take place [6]. The investigation of the internal environment will accordingly result in an overview of all weaknesses and strengths of the company, while the investigation of the external environment will result in an overview of all opportunities and threats. These are the results of the SWOT-analysis.

The external environment consists of variables existing outside the company, which in the short-term are not under the control of the company. These variables form the context in which the company exists and functions. The external environment can be further subdivided into a direct environment and an indirect environment.

The direct environment includes those elements or groups which are directly influenced by the actions of the company. Examples of these are the shareholders, the government, the suppliers, the local authorities, the competitors, the clients, the creditors and the employee's organisations. The indirect environment includes more general forces which primarily have an influence on the long-term decisions of the company. These are economic, socio-cultural, technological, political and juridical influences.

The internal environment of the company consists of variables within the company itself, of which the business management of the company does not have an influence in the short-term [10]. These variables form the enterprise context in which work takes place. They also include the company structure, the company culture and the resources of the company.

The formulation of a strategy is a process for the development of long-term plans, to effectively respond to environmental opportunities and threats in the light of the strengths and weaknesses of the company. Points of departure here are the objectives of company management, which determine the long-term objectives to be achieved. The course to be taken by the company to realise this is called the company strategy or the company policy.

In order to implement the strategy and lines of the policy chosen, action programmes are devised and budgets and procedures are drawn up. In writing this is also brought into line with the level of operational planning. A programme can hereby be considered as a collection of actions and stages which are neces-

sary for the execution of the plan. It translates the strategy into actions at an operational level. A budget, on the other hand, is the translation of this programme into financial terms. It provides a prognosis of the detailed costs of each programme for the subsequent control and evaluation of the aims.

Finally, evaluation and control is the process of following up company activities and the execution results, so that the actual execution can be compared with that desired. The business management then uses this information for corrective action or to solve problems. Despite the fact that evaluation and control forms the last important step of the strategic management process, it can also serve as a starting point for a new cycle by indicating weaknesses of the company in previously implemented strategic plans. We thus obtain a continuous process.

1.3. The studying of strengths and weaknesses

A systematic schedule for the analysis of strengths and weaknesses is something constantly gaining popularity. Companies must undertake specific actions in order to distinguish their competitive strengths and weaknesses. History has shown this to be not particularly simple. Many companies only have vague ideas of the source of certain competencies and the extent to which they possess them. The absence of a global company overview prevents a clear picture being obtained. Despite these problems the development of a competitive strategy depends on having a global overview as regards strengths and weaknesses.

The strengths and weaknesses can be found in the functional company fields, or they may be a consequence of abnormal interaction between different fields. Furthermore, the strengths and the weaknesses of an aspect must be measured at different levels of the organisation, this can be at group level, at individual company level or at product or market level [5].

The evaluation of the performances of the past may not be neglected with the measuring of strengths and weaknesses because it provides historic insight into the strategy of the company previously implemented as well as the successes accordingly achieved. Historic investigations may not only be limited to the pure analysis of the paths followed by the company

in the past and the results achieved, they must also devote attention to the reasons for this success.

The current strategic position forms a very important point of departure for the development of a future strategy. It is very difficult to understand the current strategy if a formal planning system was previously absent.

The studying of the competition, the current strategic prospects, performances from the past, the market possibilities and the market environment provide us with insight concerning information required for the indication of strengths and weaknesses. Where possible these strengths and weaknesses are to be represented in objective terms. It must be commented that most strengths concern the capabilities of certain personnel members or the resources at hand. A distinction can accordingly be made according to the present product/market combinations. It is therefore sensible to make a distinction according to the extent to which these strengths and weaknesses are of a critical nature. As regards the critical factors, an attempt must be made to sort them on the basis of strengths.

2. The use of expert system technology

Before starting any development effort, we want to know wether a knowledge-based system approach is justified and preferred over a conventional approach (if the current conventional state-of-the-art can handle this particular problem). The expert system literature offers several methods to asses the potential or the lack of potential of an application for a knowledge-based system approach.

The method of Harmon and John [2] for example gives a summary of characteristics that must be fulfilled to have a potential knowledge-based system application. First, a human expert is needed. Second, the developer needs case data to test the system. It is very important that there are cases solved by the expert that can be used to test the developed expert system. Third, the task should be narrow and well defined. The user has to specify exactly what he wants the expert system to do. Also, the developer should not try to tackle a problem that is too large or complex. It is better to start developing a narrow part of the problem to serve as a prototype. Afterwards,

the developer can expand the system. Therefore, it is important that the task can be divided in subsystems. Finally, the task should involve verbal knowledge. Verbal knowledge is suited for transformation into rules and hierarchies of objects and this is what most expert systems are suited for.

Considering these characteristics, it was clear that a lot of factors were in favour of starting the research project of building a knowledge-based SWOT-analysis system. Experts and knowledge engineers were present and motivated to do the job. Case data were available to test the system. The nature of a SWOT-analysis, however, was the most convincing argument to apply expert system technology. Making a SWOT-analysis involves significant symbolic processing, complexity, judgment and uncertainty. The task is also not too easy (solvable using conventional programming techniques) or too difficult (requiring artificial intelligence applied research methods). A SWOT-analysis does not contain much serial numeric computation which would make it convenient for classical data processing techniques.

After selecting the application and justifying the chosen technology, the development of a knowledge-based system begins with the knowledge acquisition. Knowledge acquisition is the process of eliciting the knowledge from the sources and modeling it. The term knowledge refers to knowing something with familiarity gained through experience or association. Knowledge is the integration of a collection of facts, beliefs, heuristic rules and relationships.

Knowledge acquisition involves:

· acquiring the knowledge to be replicated in the system;
· organizing and representing the knowledge in a way that ensures an accurate replication of the knowledge;
· augmenting and reformulating the knowledge, refining the heuristics and correcting errors over a period of time during the system development cycle.

The first step in knowledge acquisition is domain orientation and definition. Sources like books, reports and manuals are very important at this stage. They contain a lot of background information and static knowledge. The knowledge obtained in this way is invaluable for facilitating communication between the knowledge engineers and the experts, and for saving time and effort for all concerned.

Once familiar with the domain, a knowledge engineer can use several specific strategies and techniques to carry out the job of knowledge acquisition. Four main types of techniques are: (1) interviewing techniques: these are verbal techniques where the expert, removed from the actual problem-solving situation, is required to reflect upon, recall and explain his or her own behaviour; (2) observational techniques: here the knowledge engineer observes the expert in a real-life problem solving situation; (3) multidimensional techniques: these are contrived techniques which provide non-verbal data, they often force the expert to think about the domain in a new way; (4) automated techniques: machine learning.

After the selection of the appropriate technique, the knowledge engineer has to plan the knowledge-acquisition sessions. The most important preparation for the knowledge-acquisition sessions is to know beforehand precisely what kind of knowledge is to be obtained. That is why during some preliminary sessions, the knowledge engineers try to identify what kind of knowledge is needed (the problem space), which strategies an expert uses and which steps or tasks they involve (the reasoning process), and what kind of decisions and recommendations are possible (the solution space).

The result of these preliminary sessions is a task model called a general inference structure diagram. Such a diagram shows the relationships between the data structures (called domains) and the involved reasoning processes (called inferences). Each data structure has its own function in the decision process, called the domain role, by which it is named. In addition each reasoning process has its own specific task in the decision process, called the inference type, by which it is named.

The inference structure diagram consists of a number of tasks. For every task one has to capture the static domain knowledge and the reasoning processes. So for every task of the general inference structure the knowledge engineers have to plan one or more acquisition sessions. To perform these knowledge acquisition sessions more efficiently, we used the output–input–middle method as a knowledge organization or planning method. This method consists of the following three steps.

The first step is to make up a list of all the possible outcomes that can occur: the outputs (the solution space). These represent the goals that the expert and the knowledge-based system reach when searching for an answer. They should all be defined with subtle differences clearly identified.

The second step is to identify the various sources of information that the expert uses to deduce the outcomes: the inputs (the problem space).

Once the outputs and the inputs are defined, the data structures and their functional roles are defined.

Finally and most importantly, the third step is to determine the relationships between the inputs and the outputs: the middle (the reasoning process). This may require some intermediate states that may have to be defined. The relationships and intermediate states represent the core of the expert's knowledge.

For eliciting the rules incorporated within the reasoning process, we used the technique of structured interviewing combined with the use of dependency diagrams. A dependency diagram defines the problem space and it shows the paths along which the knowledge is used to reach a decision or recommendation. Such a dependency diagram is a powerful tool for understanding a knowledge-based system and guiding its development: it shows exactly where each knowledge segment is manipulated in reaching a decision.

3. Developing a knowledge-based SWOT-analysis system

For the development of the knowledge-based SWOT-analysis system, the background information and the static knowledge was mostly obtained by studying the Bontje model [1]. This model is primarily used to develop a business plan following a program of 6 steps. Step 3 concerns the development of a SWOT-analysis and this is also the step we want to concentrate on. This step can be summarised in an initial decision situation diagram as shown in Fig. 1.

The model of Bontje defines five management areas:
· the market;
· the money (finance);
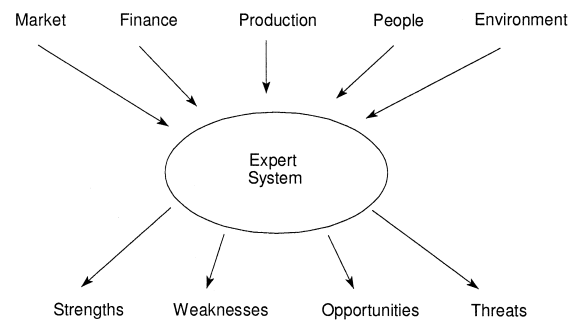· the production;
· the people;
· the environment.

Fig. 1. The initial decision situation diagram.

Each management area is analysed by means of some checklist. In answering the questions in the checklist, the manager gives a qualitative evaluation of the strong and weak points of his management. The use of checklists has the following advantages:
· they gather the historical knowledge of many people concerning this topic and are very complete;
· the checklists force the manager to look at every aspect of his company independently of his knowledge of the subject and the awareness of the problem;
· they optimise the time used for the research;
· they standardize the methodology and make it able to compare different companies and sectors.

The disadvantages of the use of checklists are the following:
· they do not measure the subjectivity of the given information;
· the manager has to follow a procedure and cannot change according to his own company situation. He loses some flexibility;
· the checklists do not stimulate the creativity of the manager and his team during the strategic management process.

After some preliminary interviewing sessions with the experts and the knowledge engineers, a general inference structure diagram is drawn as shown in Fig. 2.

The conventions for the inference structure diagram are as follows:
· a domain role is represented as a box with its name inside (usually a noun);
· an inference type is represented as an ellipse with its name inside (usually a verb);
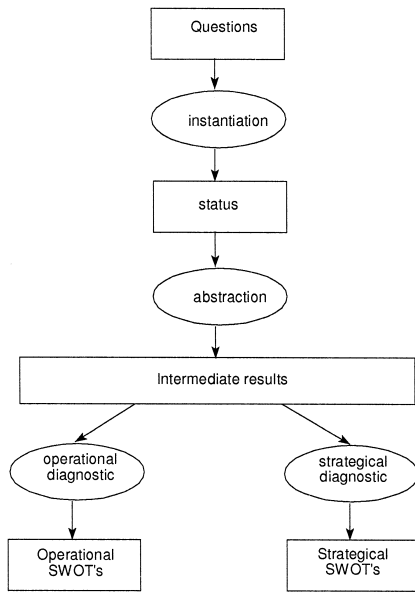
Fig. 2. The general inference structure diagram.

· the possible directions of the inference steps are marked by one-way arrows.

This diagram shows that the system consists of four major tasks: problem instantiation, abstraction, operational diagnostics, strategical diagnostics. Focusing on a certain task of this inference structure diagram, the knowledge engineer can start and guide an interviewing session.

Firstly, the purpose of the interview is explained to the interviewed expert, what the proposed system is about, where the expert's contribution should fit in and what results are expected. This allows the expert to asses what depth of knowledge will be required from him or her during the session. These focused interviewing sessions are held with one expert and two knowledge engineers. One knowledge engineer acts as the main elicitor while the other takes notes, occasionally adding additional probes and comments. This has the advantage that one knowledge engineer is more likely to pick up contradictions, clarify points and probe for more detail, which will prevent from having to return to the expert for this purpose at a later time.

For the first task, the task of problem instantiation, the inputs are the answers to questions in an extensive questionnaire of about 200 questions, according to the methodology used by Bontje. These questions encompass the five management areas. The outputs are the answers to the questions put in a hierarchy of objects. The reasoning involved is straightforward. Such a hierarchy of objects is for example the class financing with objects such as analysis balance sheet, analysis income statement, need for capital.

For the second task, the task of problem abstraction, a list of about 50 intermediate states such as current financial situation, forecast of financial situation, analysis with outsider is the output. These intermediate states represent the evaluation of the experts on each management subarea of the firm.

The inputs for this task are the answers to the questions put in a hierarchy of objects that was the output of the first task of problem instantiation. These inputs then are combined into the intermediate states through a set of rules, as shown in the dependency diagram in Fig. 3.

The basic components of the dependency diagram are the following:
· the triangles contain a rule set which manipulates the knowledge segments adjacent to the triangles;
· the boxes and arrows adjacent to a triangle show the name of the knowledge segments to which they are related and which they manipulate;
· the question marks indicate questions asked by the system in order to get information from users into the system, the subject of the question is also given.

For every triangle of the dependency diagram a decision grid, as shown in Fig. 4, is drawn which details every combination of inputs related to an intermediate state.

The knowledge engineer tries to elicit all the knowledge from the expert, to fill in completely the decision grid by continuously asking for clarification and justification, instances, explanations and even counterexamples. The grid is then entirely filled with the elicited responses. This method can produce a large number of propositional relationships between concepts in a short period of time. It is particularly suited for forcing consideration of combinations of inputs that would otherwise not come to mind, and identifying elements which co-occur, have no relationship or are contradictory. Explanations about
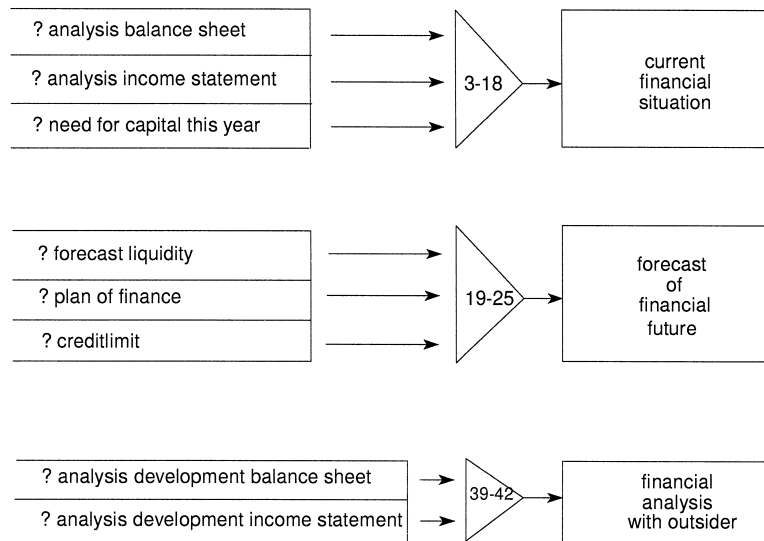
Fig. 3. A part of the SWOT dependency diagram.

these specific combinations can provide valuable insight into the nature of the domain. The graphical representation for this knowledge into a grid allows the experts to verify the completeness and the correctness of the knowledge and promotes continuity throughout the knowledge acquisition process. On the other hand it allows a knowledge engineer to implement the knowledge in categorical and normalised groups of rules.

One drawback of the technique is that it is difficult for the knowledge engineer to be sure that the answers obtained are accurate, rather than just ad hoc guesses of the expert produced under the pressure of questioning.

For the third task, the operational diagnostics, the outputs are the operational strengths and weaknesses which a firm can encounter. The inputs are the intermediate states that were the output of task two. The operational diagnostics is quite straightforward. It gives an appreciation of the expert of the value of each intermediate state. Therefore these strengths and weaknesses are to be seen at the operational planning level.

For the last task, the strategical diagnostics, the inputs are again the intermediate states that were the output of task two. But the outputs are now strategic strengths and weaknesses. The difference with the outputs from task three is that now rules were constructed to combine the intermediate states into strengths and weaknesses, where as in task three each intermediate state is evaluated individually.

Thus, the output of the knowledge-based SWOT-analysis system is a list of tactical (operational) and strategic strengths and weaknesses. In addition, each strategic strength or weakness is accompanied by a text of explanation. This output is send to a file, so it can be read on the screen or it can be printed out.

The implementation of the system, was done in Level 5 Object which is a hybrid expert system shell. A hybrid system was chosen [9] in order to take full advantage of object oriented and rule based programming techniques. The domain roles are arranged in classes and instances. The reasoning rules are programmed in pattern matching rules. For every task of the inference structure diagram a developer can choose between using a forward or a backward chaining strategy. For the SWOT-analysis system, we only used a forward chaining strategy. This choice has the advantage that the manager who has to answer the questions is forced to consider every management aspect in the checklist. In addition, using a forward chaining strategy offers a stable user interface where the answers to the questions are put into the system as default values, which greatly

CURRENT FINANCIAL SITUATION : NO ANALYSIS, WEAK, UNRELIABLE, AVERAGE, SUBOPTIMAL, OPTIMAL.

NEED FOR CAPITAL THIS YEAR	ANALYSIS OF INCOME STATEMENT															
	never				yearly				quarterly				monthly			
	ANALYSIS OF BALANCE SHEET				ANALYSIS OF BALANCE SHEET				ANALYSIS OF BALANCE SHEET				ANALYSIS OF BALANCE SHEET			
	never	yearly	quar-terly	mon-thly	never	yearly	quar-terly	mon-thly	never	yearly	quar-terly	mon-thly	never	yearly	quar-terly	mon-thly
no insight																
insight in less than 50%																
insight in 50% or more																
total insight																

Analysis of balance sheet
Do you analyse your balance sheet with ratios ?
. never
. yearly
. quarterly
. monthly

Analysis of income statement
Do you analyse your income statement with ratios ?
. never
. yearly
. quarterly
. monthly

Need for capital this year
Do you have any insight into the need for capital for this year ?
. no insight
. insight in less than 50 % of the need for capital
. insight in 50 % or more of the need for capital
. insight in the entire need for capital

Fig. 4. Grid showing every combination of inputs related to an intermediate state (current financial situation).

facilitates the input the second time the system is run for the same company.

4. Verification, validation and assessment

4.1. Verification

We define verification as building the system in the right way. One objective of verification is to ensure the systems behaves as defined by its specifications. Ideally, the specifications accurately reflect the requirements of the system. Unfortunately for a SWOT-analysis it is not possible to construct a detailed list of specification requirements. We could only give a target. The target was set to build a system which is interactive, can capture the knowledge of experts, can run on a personal computer and brings a high quality and reliable output. Although our program is built as an interactive system, we didn't used this possibility during our first case-studies due to some practical reasons. Up to now the program captures the knowledge of one expert and can run on a personal computer. The quality of the output can be called reliable because almost no mistakes were found and the quality on an operational level can be seen as very high because of the embracement and the systematic coverage of the different fields.

Verification also ensures that the system is free of errors introduced by developers during the implementation step. For this step, we checked the knowledge-base for redundant rules, conflicting rules, subsumed rules, dead-end rules, missing rules and unreachable rules. Although verification of a knowledge-based system (complete and consistent) does not imply that the system will provide the correct answers, it does ensure that the knowledge-base was properly designed and implemented.

4.2. Validation

Until recently, the issues of validity of knowledge-based systems have been addressed in an ad hoc and informal manner [8]. During the past few years we have seen more techniques being developed [11], but additional work in the area remains. The main difficulty lies in the nature of knowledge-based systems. Knowledge-based systems are not completely objective. In fact, for some applications, if you give the same situation to two experts of equal competence, each may decide to approach the problem in a different, yet correct, way resulting into two different, but adequate solutions. While both solutions approaches are appropriate, each expert may consider his/her solution to be the best while labeling the other expert's solution less than optimal. This means that an expert is the final arbiter of the correctness of the knowledge-based system, which complicates the verification and validation of such systems. The system has performed a SWOT-analysis for ten small and medium sized enterprises and we tested the quality, the reliability and the correctness of the produced SWOT-analysis. The case studies were first analysed without using the computer system and without using the structurised Bontje-questionnaire. The results of the experts and the results of the computer system were compared and the opinion of the experts was asked about the validity of the system.

The general opinion of the experts about the validity of the system was quite positive and encouraging. The strengths and weaknesses delivered by the system were most of the time the same as the strengths and weaknesses delivered by the experts. So one can say that the output of the system is quite relevant and correct. Only about 10% of the output of the system was doubted by the experts, often due to a different interpretation. In addition, some of the strengths and weaknesses mentioned by the experts were not mentioned by the system.

Most of the differences we encountered had to do with methodological questions concerning the manager and his company. The first difference belongs to the number of operational strengths and weaknesses. The number of operational strengths and weaknesses given by the knowledge-based system is much larger because every point is checked carefully and gives possible rise to a statement.

The second difference concerns the aim of the strengths and weaknesses. A good company where consultants agree on, is mostly confronted with a longer list of weaknesses than a company where things are running bad. This has to do with the way the manager is looking at his company. Managers of good companies are mostly looking to do things better and that is also why they are much more

critical for themselves while for managers of bad companies things are mostly going better than they really do. While the computer program looks at the things in the way the manager does, so the output suffers from the same disease.

Another problem we encounter concerns the way managers understand the questions. They always look at the questions as related to their own problems and forget to widen their horizon for other meanings.

4.3. Assessment

Concerning the output we can say that it gives a systematic and full overview of all characteristics of the company. Using the system reduces the time necessary to perform a SWOT-analysis. This is both an advantage for the manager and for the consultant. The length of the process is very much reduced and the rest of the time can be used to higher the quality of the output or to deepen the analysis. It is also very easy for the manager to prepare the session without the help of the consultant.

The output is much more objective and does not depend on the brightness of the consultant at that moment. The more knowledge is collected from different experts, the more objective and the higher the quality of the analysis. A possible problem will be the number of experts. If the number of experts grows, they will ask more information through questions in order to give their view. So at some point there has to be stopped and the number of questions has to be limited.

Also, for the consultant the program has some advantages and disadvantages. As an advantage we see the fact that he can use the knowledge from more experts at the same time. This may give him a different view on certain problems. This can also confirm his own view certainly for the group of starting consultants. As a disadvantage we see the fact that the use of questionnaires limits the freedom and the creativity. Nevertheless, the instrument stays up to now a supporting instrument that cannot replace the attendance of the consultant.

5. Conclusion

Good performances within a company are the results of correct interaction of the business manage-ment with its internal and/or external environment. To operate successfully in this respect, the company must concentrate its future objectives on its strengths, while averting tendencies related to the companies weaknesses. Responding to internal strengths and weaknesses is therefore an essential component of the strategic management process. But success can only be achieved in this respect to the extent that one is familiar with the opportunities and threats result-ing from the external environment. The recognition of the internal strengths and weaknesses, as well as external opportunities and threats, takes place on the basis of a SWOT-analysis. Within the framework of this study, however, we chose to concentrate solely on the internal business environment. This therefore only concerns the identification of strengths and weaknesses. Companies must undertake specific ac-tions in order to distinguish their competitive strengths and weaknesses. History has shown this to be not particularly simple. Many companies only have vague ideas of the source of certain competen-cies and the extent to which they possess them. The target was to build a system which is interactive, can capture the knowledge of experts, can run on a personal computer and brings a high quality and reliable output of strengths and weaknesses. A proto-type of the system has been developed and has performed a SWOT-analysis for ten small and medium sized enterprises. The quality of the output is reliable because almost no mistakes were found and the quality on the operational level is very high because of the embracement and the systematic cov-erage of the different fields. The strengths and weak-nesses are found in the functional company fields, or they may be a consequence of abnormal interaction between different fields. Furthermore, the strengths and the weaknesses of an aspect are measured at different levels of the organisation, this can be at group level, at individual enterprise level or at prod-uct or market level.

The software product still has to be enriched, evaluated and tested again. The expertise will have to be enlarged by interviewing other experts and making more case studies. The long-term goal is to offer a high quality SWOT-analysis which forms a solid framework for strategic planning. Using the system, the management of a company will be aware of the complexities of his own organisation and of

the environment in which he operates. Moreover, they will clearly see their own (changing) strengths and weaknesses. This will give them a longer time horizon than the one used in operational planning.

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