5.1 INTRODUCTION

The multi-variate theories discussed in chapter 4 are rather abstract in their nature, and their practical relevance can be relativized. However, they form a useful starting point for the development of a testable model that integrates organizational variables and IT.

At this point, we are able to present the research model for explaining competitive advantage by the use of IT. Firstly, the level of research is determined. This choice determines the domain about which conclusions can be drawn, and forms a constraint for the kind of variables to be used. A brief recollection of the relevant arguments, which have been discussed in the previous chapters, starts the development of the research model. Integrating the bi-variate studies with the multi-variate ideas, a research model emerges in which the three variables IT, strategy and structure can be studied at the same time. This main part of the final model, consisting of related operationalized variables, is then presented. Following that, research is carried out into whether or not empirical studies of this model have been made. Using the model, the research questions can be stated and the accompanying hypotheses, based on the final research model, are formulated.

5.2 LEVEL OF ANALYSIS: THE MESO-LEVEL OF ORGANIZATIONAL RESEARCH

Researches in the field of Organization Studies and Information Systems require a clear choice of the level of analysis (Markus & Robey 1988, p. 594; Pennings 1989, p. 4.1-21; Pfeffer 1982, p. 13). Two levels of analysis are usually distinguished, the macro-level and the micro-level (Markus & Robey 1988, p. 593):

- research at the macro-level makes statements about societies (on economic
growth issues for example) or populations of organizations (like the rise and fall of certain industries). The studies at this level make use of aggregate data on organizations or households without paying further specific attention to these institutions, which are seen as atomic objects, or black boxes;

- research at the micro-level aims at understanding phenomena of groups of people (such as decision processes), and studies features of individuals (their skills or experience for instance).

The meso-level is in-between, indicating research that is aimed at understanding general features of organizations (their structure, their performance) via the use of data of features of individual organizations (their level of centralization, the performance).

Research on all of these levels is legitimate, but a choice still has to be made between them. Considering the attention for the strategic consequences of the usage of IT for individual organizations, the meso-level is appropriate (see Chan & Huff 1992, p. 193). Therefore:

- the focus is aimed at the organizational IT, and not at the separate information systems (see 2.3.2.2 and 2.3.2.3);
- the individual organizations are units of analysis (see also Leifer 1988, p. 67; Pennings 1984, p. 345).

5.3 RECOLLECTION OF THE ARGUMENT

The goal of this research is to get more insight into the competitive usage of IT. First we studied the IT as the only relevant variable for strategic success (univariate research). However, IT as a separate factor did not offer much explanation. The same observation was made for other theoretically important variables in the organizational literature, competitive strategy and organizational structure. Obviously one variable cannot explain much variance in the competitive position (content research).

Hence we decided to study the organization from more than one angle, and we researched the effect of IT in relation with competitive strategy or organizational structure (bi-variate research). An important aspect of these variables was their relation with IT via the business processes of organizations. We concluded that these variables related very well (congruence reasons), but that the
overall results were still shallow and also inconsistent. These drawbacks are partly caused by different measures, but could also be influenced because by the neglect of a third variable.

Therefore, we asked the logical question whether it was relevant to relate the three variables in one research design (see Figure 5.1). The theoretical answer seems confirmative because in the SISP models, several variables are related simultaneously for organizational success as well. Relating the three variables IT, competitive strategy and organizational structure, is a test of the conceptual SISP models, especially because we aimed our attention at the realized organizational situation and not only at the intended policies.

Two matters would be solved if this type of test proved to be successful:

- the SISP claim (several variables have to be studied at the same time for insight into the successful use of IT) would be empirically confirmed. So far, the fit is still conceptual in the (SISP) literature. That means that the variables used are not operationalized. Therefore (comparative) surveys on the effect of the models, in which more than two variables are linked, have not yet been performed. We need a test of a multi-variate model to test the relevance of the fit of the different variables for the exploitation of the competitive opportunities of IT;
- inconsistencies in bi-variate researches would be partly explained by the
moderating role of the third variable.

We see that the SISP researches and bi-variate researches would both profit from research relating the three variables. This is possible for two reasons:

- the measurements allow a logical linkage between the three variables;
- the relations between the variables share the same (SISP) characteristics:
  - the adjustment between organizational and technological variables affects the performance of the organization. The fit causes a synergetic effect;
  - management must have intentions for the future direction of strategy, structure and IT, taking into account the present relation between them;
  - the business functions of the organization play an important role in the managerial decision-making: the goals, coordination and support of business functions should be in line. In this research the business functions themselves will not be measured; they are seen as an abstractly intervening concept between the variables measured (see for instance Egelhoff 1982, p. 436);
  - the variables mutually influence each other;
  - there is slack in organizations for more configurations, even under the same contingencies. That means that not all the choices are important for survival, and that there is no single best fit.

The question remains as to whether the effect of a fourth, fifth (and so on) variable should not be studied as well. Our answer is negative. The claim of our research, based on the concept of the SISP models, is that for clear insights into organizational issues, several organizational and technological variables and their interrelations should be studied simultaneously with regard to their effects. This claim puts into perspective the uni-variate and bi-variate approaches in their explanation of strategic performance. Such research can be performed successfully with three variables, and repetitions by adding more variables are not necessary to support this claim further. The relevant question is which variables to choose. In theory, to reach total insight, all variables should be considered. In practice, it is impossible to take all the possible organizational variables into consideration. Therefore, a theoretical model of research variables is developed, based on a theoretical exercise that makes it plausible that the relations between the variables used have a significant influence on the dependent variable, i.e. the competitive position. In our research, the plausibility lies in:

- the congruence logic between IT, strategy and structure as expressed in
the bi-variate researches, and the fact that the variables are conceptually related in the SISP models
bullet the similar conditions of the bi-variate studies and the SISP models.

5.4 RELATING IT, COMPETITIVE STRATEGY AND ORGANIZATIONAL STRUCTURE: CONNECTING DIMENSIONS AND CONFIGURATIONS

Using our approach, an extensive organizational context is taken into account in researching the strategic opportunities of IT. The three variables can be linked into one model. This model can define (fitting) states between the three variables. The hypothesis is that organizations in fitting states function better than organizations without a fit. This should be reflected in the significantly higher performance: the indicator for strategic IT usage. If this hypothesis is confirmed, then it is proven that relating a number of variables is necessary to gain insight into the strategic utilization of IT.

The heart of the final research model is based on relations between IT, strategy and structure. We shall not go into detail about the interrelations between the dimensions. This is comprehensively treated in the configuration parts of chapter 2 (section 2.3) and congruence parts of chapter 3 (subsections 3.2.2, 3.3.2 and 3.4.2). Instead, a scheme (Figure 5.2) is presented, in which two standard types (the following types 2 and 4) are visualized.
All the configurational and congruence constructions result in only eight possible IT-strategy-structure types in which there is consistency between the variables. We shall give short descriptions of the eight types.

1. Niche marketers with simple structure with unconnected IT: e.g. starting entrepreneurs.
   In these small organizations, the centralization is remarkably high. The CEO decides on all the important actions, and he aims at effectiveness. Marketing differentiation in one segment enables this centralization. Unconnected IT plays a general role for the support of the standard operations and their management.

2. Cost leaders with machine bureaucracy with concentrated IT: e.g. producers of bulk goods, social security offices.
   These organizations compete via the lowest costs and use a highly formal and regular production process. Concentrated IT with central processing supports the efficiency of the production process and the supportive administration.

3. Marketers with professional bureaucracy with distributed IT: e.g. specialized accountancy offices, university hospitals.
   Adding value to standard products can demand high quality and
complexity. For these organizations, training (and thus decentralization) is demanded. The organizations can be large, so that besides IT effectiveness (with local processing) also IT efficiency (with central processing) is appropriate.

4. Innovators with adhocracy with decentralized IT: e.g. innovative advertising agencies, architectural firms.

Competing via offering the state-of-the-art products requires an innovative mentality aimed at continually developing new processes, products and services. Hence cooperation between highly skilled operators is a necessity. The integrative and innovative potential values of IT can be used perfectly in these organizations.

5. Marketers with simple structure with unconnected IT: e.g. larger entrepreneurs.

Growing niche marketers can deliver to more market segments (lower focus). As long as the complexity stays controllable for one person, direct supervision is the coordinating mechanism. The IT is still not needed for efficiency reasons.

6. Low costs marketers with machine bureaucracy with concentrated IT: e.g. larger formalized organizations.

If the efficiency of the production process is not disturbed, differentiation can be a supportive means of competing for large low costs organizations. Concentrated IT is suitable for these organizations; differentiation is less important than efficiency.

7. Low costs marketers with machine bureaucracy with distributed IT: e.g. larger formalized organizations.

IT that offers more capabilities can also be used by ‘low costs marketers with machine bureaucracies’. In that situation, more value is already given to professional task performance, still without giving up the efficiency advantages.

8. Niche innovators with adhocracy with decentralized IT: e.g. specialized research and consultancy firms.

When enough innovative absorption potential is present in certain market segments, innovators can allow themselves to compete at (only) one of those segments: focus.

The combinations of these types are determined by the configurational and congruence constraints. These are represented in Figure 5.3.
The relation between IT, strategy and structure, directed by SISP, is hypothesized as being important to the competitive position. This hypothesis is rooted in the idea that IT must be related with several organizational variables in order to get insight into its exploitation. This idea is operationalized and tested via measurement, and therefore variables had to be chosen. If it can be demonstrated empirically that interaction between these three variables significantly influences the competitive position, two things will be indicated:

- Conceptual models containing variables like IT, strategy, structure and so on are useful. Practitioners are given assistance in using those models via the operationalization in this study;
- The influence of IT related with strategy or structure, is distorted by the third variable that functions as a moderator. This causes inconsistency between the bi-variate researches (Maxwell & Delaney 1990, p. 327).
5.5 RESEARCH ON THE STRATEGIC IMPACT OF IT, COMPETITIVE STRATEGY AND ORGANIZATIONAL STRUCTURE

Some preliminary attempts have been realized to combine the three variables. As early as 1980, Buchanan & Linowes stated that information systems should match a company's strategy and structure (Buchanan & Linowes 1980, p. 145). They recognized that the key to the design for organizations was not only the match between strategy and structure, but also the more complex match involving strategy, structure and administrative systems, embodied in the IT. The IT assists the management in controlling (performing) and coordinating the organization's value chain activities. They also saw the impact role of IT. It not only supported organizational structure, it was also an enabler in making it more elaborate.

Also in the study of Broadbent & Weill, three aspects of the organizational structure were important in linking business and information strategies (Broadbent & Weill 1991, p. 300):

- the organizational structure that complemented strategy;
- decision-making processes appropriate to strategic orientation;
- accountabilities appropriate to strategic orientation.

Comments
Both studies did not mutually relate the fit and the strategic performance by comparing many organizations in a survey. The empirical body of knowledge concerning this relation is very small. With this research, we want to supplement this knowledge.

5.6 ULTIMATE RESEARCH GOAL AND RESEARCH QUESTIONS

Now that we have developed the theoretical model, it is possible to further specify the preliminary research goal and to state the research questions required.

In chapter 1, it became clear that the expensive IT offered strategic opportunities, but that these opportunities were difficult to realize. Another observation was that the existence of SISP offered no guarantee for realizing competitive advantages with IT. Therefore the preliminary research goal was stated as follows: to gain insight into the strategic usage of IT.

In this chapter, the usage of IT (and not the level of IT investments) in the organization is viewed as crucial for exploring the strategic effect of IT on the
organization. Considering the relevance of fit in organizational and information systems research, the usage is described by the fit between IT and organizational variables. So far, this fit has not been made explicit. This raises questions like:

- how can the fit between IT and organizational variables be measured?
- how does a fit relate to the competitive position of the organization?

The relations between only two variables like strategy - IT and structure - IT were studied in the literature, but the results were not consistent. It seemed only logical to relate the three variables within one study.

Also in this chapter, the role of the managerial decision-making is viewed as necessary for finding an IT - organization fit. Not only is a consistent policy needed on this matter, but the IT management needs the commitment of the top and line management to support IT development, implementation and IT usage in the organization.

Research goal

Via these two angles (IT - organization fit, managerial guidance and commitment), the preliminary research goal can be detailed in the final goal. The mismatch between organization and IT hampers realizing the strategic opportunities. This may result in a decreasing commitment from the management, which would trouble further IT investments and IT usage. Finding a good match is a complex problem. This research wants to deal with that problem by concretizing relevant organizational variables and IT.

Therefore, the research goal is stated as:

the finding of concrete fits between IT, strategy and structure as targets for the management of organizations to use IT strategically. Via these targets, the use of SISP can be concretized.

Research questions

To reach the research goal, it is necessary to discover fits between IT, strategy and structure that are really successful. This notion leads to the first research question.

1. Do fits between IT, competitive strategy and organizational structure have a positive effect on the realization of the strategic opportunities of IT?

Furthermore, it is important to know if organizations generally find themselves in situations in which these fits occur. This would mean that the opportunities of IT
are generally used well.

2. Are organizations relatively often situated in those balanced fit situations?

If this is not the case, then organizations need insight into strategic IT usage. SISP can be a useful instrument to search for the right usage of IT.

3. Does the existence of mature SISP have a positive effect on the presence of organizations in those balanced fit situations?

If the answer is negative, then SISP should be abandoned as a useful instrument or should be improved with new conceptual and/or practical insights. For this third question, the research model is slightly extended to research the origin of the fits between the variables (see Figure 5.4: Final theoretical research model).

5.7 ULTIMATE RESEARCH MODEL AND HYPOTHESES

The hypotheses give the expected answers to the research questions based on the theoretical model (Verschuren 1988, p. 126). Together they form the research model under scrutiny.

Hypothesis 1. Fits between IT, competitive strategy and organizational structure have a positive effect on the realization of the strategic opportunities of IT.

The model gives eight appropriate states backed by arguments from the CT, SISP and the bi-variate researches. It is expected that organizations in one of these states of fit have a significantly higher strategic performance than organizations in other states. By using the 8 states, Hypothesis 1 can be split up into 8 partial hypotheses.

1.1 Niche marketers with simple structure with unconnected IT have a high strategic performance.

1.2 Cost leaders with machine bureaucracy with concentrated IT have a high strategic performance.

1.3 Marketers with professional bureaucracy with distributed IT have a high strategic performance.

1.4 Innovators with adhocracy with decentralized IT have a high strategic
1.5 Marketers with simple structure with unconnected IT have a high strategic performance.

1.6 Low costs marketers with machine bureaucracy with concentrated IT have a high strategic performance.

1.7 Low costs marketers with machine bureaucracy with distributed IT have a high strategic performance.

1.8 Niche innovators with adhocracy with decentralized IT have a high strategic performance.

Hypothesis 2. Organizations are not relatively often situated in those balanced fit situations.

In the first chapter, it was outlined that the exploitation of IT was generally disappointing. This means that organizations probably do not exploit their strategic IT opportunities. It can be expected, based on dispersion of the values of the organizations' variables IT, competitive strategy and organizational structure that organizations will not be present significantly more in the eight fits of the model than in the surrounding states.

Hypothesis 3. The existence of mature SISP has a positive effect on the presence of organizations in those balanced fit situations.
The current perspective of SISP is that of a managerial instrument that not only considers the (automation of the) information services but also the role of the organizational aspects. Will this approach be more successful than the traditional ones? Earl found some preliminarily positive results for this model which he calls the Organizational Approach. Organizational members of various departments work together in interdisciplinary teams and develop a shared opinion on feasible information systems. The approach does not exactly prescribe a method, but lets the SISP evolve during the implementation. The process is incremental, but planning still happens (Earl 1993, p 11). In this approach, IT and the organizational aspects are seen as being mutually influencing, related via the business functions of the value chain and directed by SISP as a managerial decision-making instrument. Therefore, it is expected that this SISP will be successful. This means, for each of the eight favorable states, that organizations using SISP will be significantly more often situated in these fits than in the surrounding states.

To test the hypotheses we shall first (further) operationalize the different variables. Then the differences in competitive positions of organizations can be compared with the differences in the various fits. In the next chapter, we shall describe this operationalization and the analyses needed.