C Contingency Theory as an Approach to Explain Early Warning Behavior

Now the underlying theory of this work will be introduced. According to the research questions not only the early warning behavior of CEOs of medium-sized companies has to be assessed in general but also factors that influence this behavior have to be analyzed. Therefore, in the following the contingency theory which aims to explain organizational structure and design by considering contextual variables will be presented. First, the classical approach will be explained, followed by its extension. Then, the criticism of the contingency theory is presented and discussed. After that, it will be discussed whether this theory is appropriate to answer the research questions. In part four, the research model and its variables will be deduced by combining the classical approach of the contingency theory and its extension with the model of DAFT and WEICK. Finally, in part five the state of empirical research will be presented.

1 Basis of the Classical Contingency Theory

1.1 Development of the Classical Contingency Theory

The contingency theory was a critical reaction to the organizational theories of WEBER[180] and TAYLOR.[181] Two major shortcomings of their theories were criticized. First, WEBER's concept of bureaucracy was not concordant with empirical finding[182] and second, classical recommendations of the organizational theory did not consider situational differences and therefore, were not flexible and adaptable enough.[183] WOODWARD was one of the first who no longer looked for the one best way concept that does not consider situational differences. She considered external factors such as

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180 See Weber (2006).

181 See Taylor (1998).

182 "[I]t must be admitted that [Weber's] conceptualization in terms of ideal types ... presents many difficulties to the research worker. ... [T]he main problem for the researcher has been how to use Weberian concepts in analysis with data on real functioning organization." Pugh, Hickson, Hinings, MacDonald, Turner and Lupton (1963), p. 293f.

183 See Staehle (1973), p. 30. For further also theoretically based critics of Weber's theory see Bennis (1971), p. 436f.

technology before recommending an organizational structure.[184] The next researchers did not only examine the technical environment of the organization but also asked how organizational structure was depending on all relevant aspects of the organizational environment.[185] Having clarified the general direction of research, mainly two groups of scientists, one from the University of Chicago,[186] and the other from Aston University in Birmingham,[187] were responsible for further development of the contingency theory.

1.2 Aims and Main Assertions of the Classical Contingency Theory

The contingency theory aims to answer three questions:[188] 1) How can the organizational structure be measured empirically? 2) How do contingency variables influence the organizational structure? 3) What is the effect of different combinations of situation and structure on organizational efficiency?[189] "The major difference of this newer approach from earlier organizational theories lies in its acknowledgment that the process of designing organization involves the selection of a configuration that will best suit that particular situation which prevails."[190] Therefore, the fundamental thesis of the contingency approach is that organizations have to adapt to their environment in order to have high organizational performance.[191] The contingency theory wants to show this organizational structure's functional dependency on contingency variables and to prove it empirically.[192] The underlying assumption of this dependency is that

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184 "It appeared that different technologies imposed different kinds of demands on ... organizations, and that these demands had to be met through an appropriate form of organization." Woodward (1975), p. 16. See also Woodward (1980) p. 247f.

185 Burns and Stalker for example analyzed the influence of dynamics of the environment on the organizational structure. See Burns and Stalker (1961), p. 19ff.

186 Blau, Schoenherr and Meyer were responsible for basic and methodological research.

187 Pugh, Hickson, Payne und Hinings concentrated on the simultaneous analysis of various contextual variables.

188 See Kieser and Kubicek (1992), p. 61f.

189 The answer to the first question is the prerequisite to be able to answer the last two questions.

190 Child (1973), p. 237.

191 Parallels between the contingency approach and the biological evolutionary theory exist. "The idea is an elaboration of the biologist's functionalist view of the adaptation of living forms to their environment. For example, elephants have trunks to enable them to feed from their great height, and apes have prehensile fingers and toes to enable them to swing from trees. Contingency theory indicates the kinds of structure that may be appropriate responses to each of several different organizational contexts or situations." Khandwalla (1977), p. 237.

192 See Breilmann (1990), p. 2.

only successful organizations survive and therefore only the organizational structure of successful organizations is observable.[193]

The classical definition of organizational structure comprises "five primary dimensions"[194]: 1) specialization, 2) standardization, 3) formalization, 4) centralization and 5) configuration of the organizational culture.[195] According to the contingency theory these aspects characterize every organization and are determined by the organizational environment. Environmental uncertainty is the contingency variable of this environment that has to be considered the most.[196] Researchers have also considered organizational size[197] and production technology[198] as contingency variables.[199]

At this point the difference between the two approaches within the contingency theory – Cartesian and configuration approach[200] – have to be illustrated. Followers of the Cartesian approach "argue that fit between context und structure is a continuum that allows frequent, small movements by organizations from one state of fit to another."[201] Therefore, high performing organizations adapt their structure gradually to context. Three important findings of the Cartesian approach about the fit between context and organizational structure are now presented. 1) BURNS and STALKER observed twenty British and Scottish firms and identified two different types of organizations: mechanistic and organic ones. The mechanistic organization was characterized by a high degree of hierarchy and formalization; the organic one by a low level. Their finding was that, depending on the environment, each of these types can be successful. Mechanistic organizations tend to be successful within a stable environment, characterized by a low degree of complexity and dynamic, organic ones within an unstable environment.[202] 2) The degree of bureaucracy of successful organizations is

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193 See Gerdin and Greve (2004), p. 307 and Donaldson (1996), p. 57ff.
194 Pugh, Hickson, Hinings and Turner (1968), p. 65.
195 See Ibid., p. 72ff.
196 See Child (1975) and Burns and Stalker (1961).
197 See Pugh, Hickson, Hinings and Turner (1969), Hickson, Pugh and Pheysey (1969), Blau (1970), Child and Mansfield (1972) and Child (1975).
198 See Hickson, Pugh and Pheysey (1969), Child and Mansfield (1972) and Woodward (1975).
199 For an overview of possible contingency variables see Kieser and Kubicek (1992), p. 224 and Kieser (1999), p. 175.
200 See Gerdin and Greve (2004), p. 304ff.
201 Ibid., p. 304.
202 See Burns and Stalker (1961). See also Lawrence and Lorsch (1967), Bourgeois, McAllister and Mitchel (1978) and Argote (1982).

aligned with organizational size.[203] 3) WOODWARD finds that the degree of task routine has a positive influence on the degree of bureaucracy and hierarchy. Custom-design technologies and batch-technologies are found in organizations with low hierarchies and little staff, whereas mass production is found in organizations with high hierarchies.[204]

In contrast to the Cartesian contingency approach the configuration approach argues that there exists only a limited number of possible combinations of the above mentioned five structural variables.[205] "The mathematician tells us that p elements, each of which can take on n forms, lead to p^n possible combinations. […] But the world does not work like that. There is order in the world, but it is a far more profound one than that – a sense of union or harmony that grows out of the natural clustering of elements, whether they be stars, ants, or the characteristics of organizations."[206] [207] Therefore, MINTZBERG differentiates between five structural types with specific coordination mechanisms and forms of centralization.[208] So, a successful organization chooses the form out of these five structural types that best fits to its environment. MINTZBERG's theoretical assumption of organizational basic forms was later confirmed by the empirical works of MILLER and FRIESEN.[209] Another example of the configuration approach is the strategy typology of MILES and SNOW. They argue that "[o]rganizational survival may be said to rest on the quality of the 'fit' which management achieves among such major variables as the organization's product-market domain, its technology for serving that domain, and the organizational

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203 See Rushing (1966) and Pugh, Hickson, Hinings and Turner (1969).

204 See Woodward (1975). Other contingency variables were considered as well. For example Chandler analyzed the history of the 70 largest organisations of the United States. See Chandler (1966). He found out that the decentralized multidivisional structure was depending on the growth strategy of the organisation. A decentralized multidivisional structure was wide-spread for organizations in pursuit of a diversification strategy. The opposite was true for organizations pursuing a growth strategy within one single industry. This was later validated by Fouraker and Stopford. See Fouraker and Stopford (1968).

205 See Mintzberg (1979), p. 299.

206 Ibid., p. 300.

207 The assumption of a limited number of structural types is in line with the Darwinistic view. "[S]pecies at any one period are not indefinitely variable, and are not linked together by a multitude of intermediate gradations, partly because the process of natural selection will always be very slow and will act, at any one time, only on a very few forms; and partly because the very process of natural selection almost implies the continual supplanting and extinction of preceding and intermediate gradations." Darwin (1968), p. 231.

208 See Mintzberg (1979), p. 305ff.

209 See Miller and Friesen (1984), p. 31ff.

structures and processes developed to coordinate and control the technology."[210] Based on this idea, they found four organizational archetypes: defenders, prospectors, analyzers and reactors.

The difference between the two approaches of the contingency theory is also illustrated below.

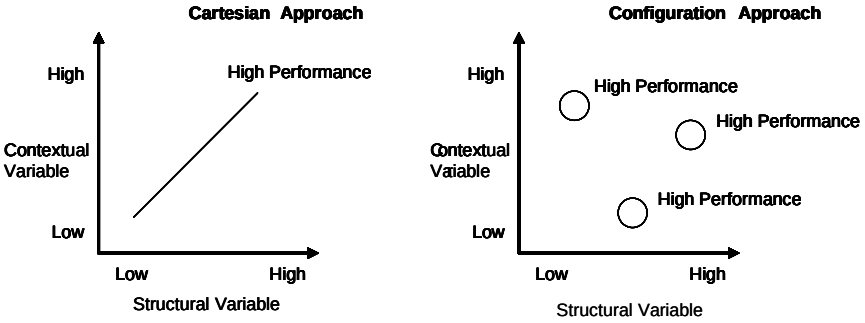

Figure 10: Difference between the Cartesian and Configuration Contingency Approach[211]

Finally, the role of organizational members according to the classical contingency theory is analyzed. According to it, the organizational structure is determined by exogenous factors and not by characteristics and behavior of its organizational members.[212] The individual only influences organizational success. The individual itself is directly influenced by the organizational structure and the environment.[213] For example, the degree of bureaucracy influences the employees' flexibility and the individual's innovativeness.[214] This reasoning is presented in figure 11.

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210 Miles and Snow (1978), p. 35.
211 See Gerdin and Greve (2004), p. 306.
212 See Lawrence and Lorsch (1967), p. 186.
213 "The organizational setting limits and influences people's behavior[.]" Payne and Pugh (1976), p. 1126. See also Breilmann (1990), p. 16 and Lawrence and Lorsch (1967), p. 17.
214 For an overview of effect of the organizational structure on the individual see Kieser and Kubicek (1992), p. 422f.

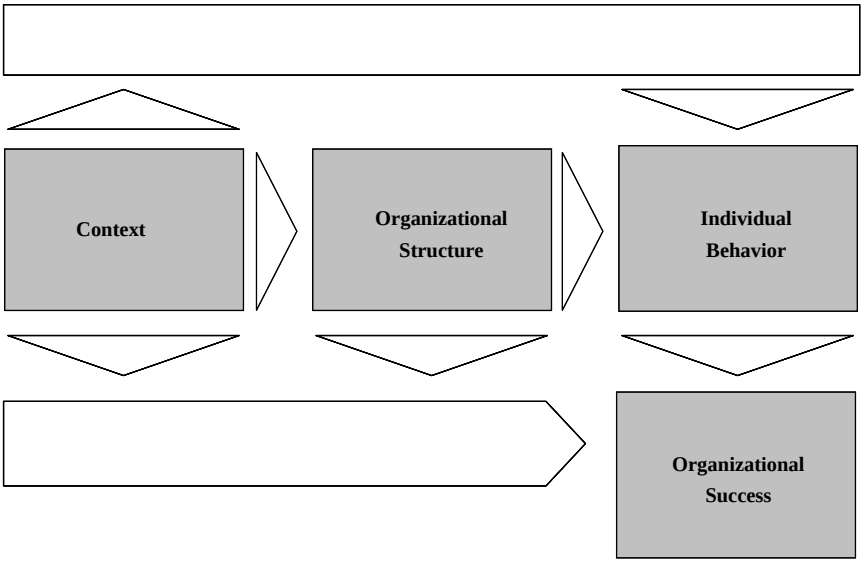

Figure 11: Assumed Causal Relationships by the Contingency Theory[215]

2 Extension of the Classical Contingency Theory

The main assumption of the classical contingency theory that the organization is only determined by its environment was criticized by researchers such as SILVERMAN,[216] CHILD and MANSFIELD.[217] The decision about the development of organizational structures is often not the result of rational choice because at the time of the decision about the organizational structure not all possible variants and their effects are known. Additionally, not only organizational goals are considered and other goals such as the will to retain power also influence the development of the organizational structure. Therefore, researchers of the extended contingency theory concluded that organizational structures are created by human beings and directly influenced by them.[218] They argue that "the structure of an organization is not an immutable given, but rather a set of complex variables about which managers can exercise considerable

[215] Adapted from ibid, p. 61.
[216] See Silverman (1968), p. 223.
[217] See Child and Mansfield (1972).
[218] See Ibid., Hrebiniak and Joyce (1985) and Hrebiniak and Einhorn (1990).

choice."[219] This means that the almost mechanistic determination of the organization by situational variables is no longer assumed.

Following this reasoning, CHILD developed the concept of strategic choice. He assumes the existence of a "dominant coalition"[220], e.g. a group of managers such as the board. The power structure within the organization determines which members of the organization belong to this coalition. Top managers will mostly be part of it. Within this group every member knows about suitable organizational structures[221] yet at the same time has their personal goals.[222] The values and goals of the dominant coalition are called management philosophy or organizational philosophy and they determine organizational structure.[223] MONTANARI showed this relationship empirically between managerial philosophy and organizational structure.[224]

CHILD's theory marked the beginning to consider the influence of the individual manager on organizational design[225]. Further researchers assumed that "decision making, leadership, strategy formation, structuring, and organizational change are influenced in subtle and complex ways by invisible, long-standing psychological forces."[226] Especially in the context of young firms, the influence of the entrepreneur's personality could be shown empirically.[227] However, concerning large organizations the question whether or how top managers influence the organizational design was rarely put.[228] In this context MEYER and STARBUCK were able to show such an influence at the example of the NATIONAL CASH REGISTER COMPANY. They analyzed the development of this organization for a period of 33 years and were able to demonstrate how individuals imprint their personality on organizations.[229] STOPFORD and BADEN-FULLER examined six turn-around companies and reached

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219 Lorsch, in Child (1984), p. 7.
220 Child (1972), p. 13.
221 See Miles (1975), p. 31ff., DiMaggio and Powell (1983) and Meyer and Rowan (1977).
222 These individual goals do not necessarily have to differ from the goals of the organization.
223 See Breilmann (1990), p. 105ff., Hambrick and Brandon (1988), p. 3f. and Baligh, Burton and Obel (1990), p. 35ff.
224 See Montanari (1979).
225 See Breilmann (1990), p. 175ff. for an overview of the most important empirical studies about the influence of the individual on the organizational structure.
226 Kets de Vries and Miller (1984), p. 1 (format of source not adopted). See also Romanelli and Tushman (1988), p. 129ff.
227 See Lang von Wins (2004), p. 29ff., Brandstätter (1997), p. 168ff., Eisenhardt and Schoonhoven (1990), p. 520f. and Rauch and Frese (2000), p. 130ff.
228 See Bobbitt and Ford (1980), p. 13ff.
229 See Meyer and Starbuck (1992), p. 102ff.

similar results.[230] Empirical evidence about the influence of individual managers was also provided by examples of new CEOs and their influence on the organizational structure.[231] These new CEOs for example introduced divisional structure.[232] Their influence was studied in organizations such as GENERAL MOTORS[233] and GENERAL ELECTRIC[234].

Further on the influence of specific attitudes of managers on organizational design was studied.[235] "Attitudes are defined as enduring psychological properties of the individual: i.e., characteristics that are relatively stable across time and situation. Personality is comprised of clusters of attitudes."[236] They influence intentions and behavior itself.[237] This notion attitude comprises individual differences such as traits, beliefs and values.[238] For example, MILLER stresses the importance of managerial attitudes and considers them as an important contingency which together with the traditional contingency variables determine the organizational structure.[239]

MILLER and DRÖGE were among the first researchers with an empirical study to show "that CEO personality might be influencing structure."[240] They focused on a single CEO's attitude. "[C]hief-executive-officer need for achievement influences the intended rationality of the strategy-making process, which in turn influences structural formalization and integration."[241] Their hypothesis was that chief executives with high need for achievement want to control the organization and therefore tend to prefer a high degree of centralization, formalization and horizontal coordination. They were able to show this relationship empirically.[242]

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230 See Stopford and Baden-Fuller (1990).
231 See Dale (1962) and Clee and Sachtjen (1964).
232 See Channon (1973), p. 76 and Mayer (1974), p. 187.
233 See Sloan (1963).
234 See Greenwood (1974).
235 In addition, researcher also analyzed the influence of CEOs' beliefs and values on organizational design. See Hambrick and Brandon (1988), Meyer and Starbuck (1992) and Baligh, Burton and Obel (1990).
236 Lewin and Stephens (1994), p. 189. See also Rokeach (1968), p. 82ff.
237 See Bass, Barnett and Brown (1989), p. 184 and Fishbein and Ajzen (1975), p. 5 and 21ff.
238 See Robinson, Shaver and Wrightsman (1991) in Lewin and Stephens (1994), p. 189.
239 See Miller, Kets de Vries and Toulouse (1982), Miller and Dröge (1986), Miller and Toulouse (1986) and Miller, Dröge and Toulouse (1988).
240 Miller and Dröge (1986), p. 539.
241 Miller, Dröge and Toulouse (1988), p. 544.
242 See Miller and Dröge (1986). For a detailed explanation of this attitude see D 2.3.

A second attitude examined in the context of organizational design is locus of control. MILLER et al. found out that individuals with an internal locus of control pursue different strategies from those of individuals with an external locus of control.[243] In addition to that, BURNS and STALKER showed that the design of organizations managed by individuals with an internal locus of control are more organic than organizations managed by individuals with an external locus of control.[244]

Although single personality characteristics such as need for achievement or locus of control have been analyzed until the research of LEWIN and STEPHENS "no integrative framework has been advanced linking a variety of CEO attitudes to their choices of organization designs"[245]. The organization design comprises the structure of an organization and is defined "as encompassing the organization's formal architecture (e.g. configuration, centralization, standardization, specialization), culture, decision-making norms, ethics, structure of employment relationship (e.g. work rules, grievance procedures, compensation system, norms regarding participation) and strategy."[246] LEWIN and STEPHENS extend the classical contingency theory and "believe that one crucial contingency – the attitudes of the general manager and in particular the chief executive officer – is a major source of variations in organization design."[247] Their model, an integrative framework, comprises eight attitudes of a CEO that exercise influence on organizational design: locus of control, tolerance for ambiguity, need for achievement, risk propensity, egalitarianism, moral reasoning, Machiavellianism and trust in people. These eight attitudes are the result of a method, comprising two steps. "First, using a deductive approach, we included all those attitudes shown by previous researchers to have an effect on organization-design preferences. Next we consulted a comprehensive source of attitude inventories … and included every attitude for which we could pose a plausible inductive analogue in organization-design preferences."[248] The attitudes analyzed by this theory are characterized by four features: 1) In order to assess these attitudes, there exist measures of established reliability and validity, 2)

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243 See Miller, Kets de Vries and Toulouse (1982), p. 244ff. For a detailed explanation of this attitude see D 2.1.

244 See Burns and Stalker (1961), p. 34f.

245 Lewin and Stephens (1994), p. 185.

246 Daft and Lewin (1990), p. 3. Other researchers employ the term organizational design as a synonym to organizational structure. See Galbraith (1977), p. 5ff.

247 Lewin and Stephens (1994), p. 183f. Nevertheless, they still consider the environment to be a fundamental contingency factor influencing organizational design.

248 Ibid., p. 190.

these attitudes might influence organizational design, 3) the attitudes are common among CEOs and 4) the value of these attitudes differ among CEOs.[249]

So far the study has shown that the original hypothesis of the contingency theory – the view of the organization as a product of its environment – was extended. Groups of individuals or single individuals also have an important influence on organizational design. In this context, it was LEWIN and STEPHENS who first developed a concept of relevant managerial attitudes influencing organizational design.

3 Critical Assessment of the Contingency Theory

The contingency theory is not without critics.[250] Analog to the last two parts, first, critical points about the classical approach and then specific potential weaknesses of its extension are presented and discussed.

The classical contingency theory analyzes the effects of situational variables on the organizational structure and tries to determine the degree of efficiency of combination between the environment and organizational structure.[251] Three of its main assumptions are under dispute: 1) The classical contingency theory claims that the structure of an organization is the result of its situational variables. The first reason not to assume such a strict determination of structural variables of the organization by situational ones is the fact that the latter are not simply given but can be altered. So the management itself can influence these situational variables, for example by creating new markets.[252] In addition to external variables the organizational structure can also be influenced by internal variables. HIRSCH-KREINSEN and SPRINGER for example show that organizations which introduce computerized numerical control machines successfully do so by applying different operational procedures which depend on existing organizational structures. In contrast to this, the classical contingency theory assumes that the introduction of such a new technology induces only one best organizational structure. But the example shows that contingency variables such as technology do not necessarily influence organizational structure. Internal variables such as operational procedures might be the major source of influence. This first criticism of the classical contingency theory can be refuted

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249 Ibid., p. 190.
250 For a detailed overview see Krohmer (1999), p. 44f.
251 See Schreyögg (1978), p. 6.
252 See Child and Mansfield (1972), p. 369.

because, although management can change situational variables and the organizational structure might also be influenced by internal variables, the causal relationship between situational variables and organizational structure still remains predominant. 2) The classical contingency theory assumes that there exist only organizational structures that most suitably fit the environment. Organizations with other structures would no longer exist and be eliminated. As the example of the introduction of computerized numerical control machines has shown, various organizational structures fit situational variables such as new technology. And even if a non-optimal fit between a contingency variable and an organizational structure exists, this will not imply that this organization will be automatically eliminated by the market. For example, an organization lacking a distribution structure optimally adapted to its environment might compensate this weakness with high-quality products.[253] This last critique point is only correct in parts: the choice of a non-optimal combination between an organization's structural element and the environment does not automatically imply the elimination of an organization. The reason is that an organization's success does not only depend on one structural aspect and its alignment to the environment. 3) Finally, the contingency theory assumes a measurable organizational structure. Scientists as the adherents of constructivism oppose this view and understand the organizational structure not as a set of rules but as the result of interpersonal communication and decisions.[254] According to them, actions within an organization are not the result of formal organizational structures but of interactive processes which lead to commonly shared views about activities and organizational goals.[255] Therefore, the organizational structure is the result of actions and hence, hardly measurable.[256] In the context of this work the individual action of early warning is the object for analysis and not an impersonal structure that refers to this point of critique.

Apart from this fundamental criticism of the main assumptions of the classical contingency theory further points of criticism are discussed.

The classical contingency theory is mainly based on empirical studies and thereby follows the trend of organizational sciences during the 1960ies and 1970ies. These studies were possible by increasing computer capacity and more efficient statistical

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253 See also Pennings (1992), p. 274.
254 See Brown (1978), p. 378.
255 See Smiricich (1983).
256 See Silverman (1968).

programs.[257] In this context, the exploratory method of the contingency theory is criticized. Only after a statistically significant correlation between environment and organizational structure was found, a theoretical reason was sought.[258] Therefore, conceptual aspects are not the main interest.[259] In this study, this point of criticism is not valid because the chosen procedure is confirmatory.[260] The starting point is a conceptual model. The hypotheses are deduced from literature and then valuated empirically. In the context of the empirical method of the classical contingency theory, specific statistical procedures and methods, also a lack of representativeness of the samples in a lot of empirical studies is criticized.[261] In this empirical work the sample's representativeness of the basic population was proven by a χ^2-test.[262] Additionally, the measurement method of this work, the PLS method, was chosen according to the nature of the empirical data and object of analysis[263]. Finally, the measurement's criteria are analyzed and discussed on all measurement levels, i.e. the levels of the items, the constructs and the structural models.[264]

The classical contingency approach analyzes current organizational structures and therefore cannot predict optimal future structures. As a consequence it might postulate organizational conservatism, i.e. traditional organizational structures which have been successful in the past.[265] One of these conservative organizational structures is the tayloristic organization. For the last decades the tendency to introduce such structures has been empirically shown.[266] In the context of this research such a point of criticism can also be refuted because only the current state of organizational structure is assessed.

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257 See Kieser (1999), p. 170.

258 For an example of such a procedure see Burns and Stalker (1961), p. 94f. Within this context two points have to be differentiated: 1) the reason of systematic relations and 2) the statistical explanation for them. A high correlation does not automatically imply a high degree of scientific explanation because variables that are statistically highly correlating can be independent from a scientific point of view. Therefore, a systematic check of statistical correlation is indispensable. See Rasch, Friese, Hofmann and Naumann (2004), p. 118.

259 See Frese (1992), p. 191.

260 See D.

261 See Otley (1980), p. 419.

262 See F 1.2.

263 See F 2.

264 See F 3 and G 2.

265 See Child, Ganter and Kieser (1987), p. 87.

266 See Köhl, Esser, Kemmner and Förster (1989), p. 252f. and Schultz-Wild, Nuber, Rehberg and Schmierl (1989), p. 172ff.

The classical contingency theory makes assumptions about the optimal fit between the environment and the organizational structure. But it sometimes does not consider cultural differences or even explicitly assumes that cultural differences do not exist. HICKSON et al. for example show that in the Japanese, British and Swedish context organizational size is correlated with degree of specialization, decentralization and formalization.[267] Such a generalization is problematic because the understanding of elements of the organizational structure differs from country to country. This point of criticism does also not apply to this research because it is limited to Germany and the generalizability of its finding to other countries is not assumed.

Finally, the classical contingency theory does not consider the influence of management as an additional contingency variable because it regards the organizational structure as functionally only dependent on situational variables. Other influences on the organizational structure such as the management's willingness to dominate are not considered.[268] This led to the extension of the contingency approach to take the individual's influence on the organizational structure into account.

But this extension was also criticized. Although the correlation between personal characteristics of managers and organizational structure was shown, the explanatory power of such characteristics was not compared with the one of classical contingency variables.[269] This research does not have this shortcoming because it compares the degree of influence of the different contingency variables. Additionally, it is problematic to assume that only one single person influences organizational structure. Often a group of managers such as a board of managers influences the organizational structure. This point is not valid in the context of this investigation because only medium-sized companies are analyzed in which the CEO's influence is significant and where generally no board exists to determine organizational structure. It is also criticized that the organizational structure is influenced by a number of persons in the history of the organization. To understand the influence of these different personalities, their characteristics and their influence on the design of the organization have to be analyzed; this would be almost impossible.[270] In contrast, this study believes

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267 See Hickson, Hinings, McMillan and Schwitter (1964).

268 See Clegg and Dunkerly (1980), p. 433ff., Clegg (1981), p. 545 and Benson (1977), p. 10.

269 See for example Miller and Dröge (1986) and Miller, Dröge and Toulouse (1988). For an overview of such studies see Breilmann (1990), p. 175ff.

270 See Kieser and Kubicek (1992), p. 223.

that in medium-sized companies the influence of the current CEO is so high that he dominates the influence of former managers.

4 Application of the Contingency Theory to Early Warning Behavior, Research Model and its Variables

4.1 Application of the Contingency Theory to Early Warning Behavior

According to research question two the factors influencing early warning behavior have to be analyzed. Traditionally the contingency approach aims to explain organizational structure with contingency variables. As seen above, the extended contingency theory tries to explain even more – the design of the organization. "The construct of organization design […] is much broader than the traditional construct of organization structure: design denotes any macro-level organizational property."[271] Talking about organization design, LEWIN and STEPHENS think of "means to achieving results"[272]. One of these means is information processing.[273] Therefore, the aspect of environmental scanning and interpreting these data is important within the integrated framework of LEWIN and STEPHENS.[274] Their extension of the classical contingency theory which includes the classical contingency approach will be applied to early warning. In the context of this work the assumption of the Cartesian approach about organizations gradually adapting to traditional contingency variables is applied because empirical findings have shown that successful organizations tend to adapt gradually to their environment and that the existence of a limited number of stages often remains theoretical and presents a reductionistic view of reality.[275] This gradual adaptation to the environment will be reflected by hypotheses in the context of research question three about the success of early warning behavior. Organizations with successful early warning behavior will align their early warning behavior more with traditional contingency variables than unsuccessful organizations.[276]

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271 Lewin and Stephens (1994), p. 187.
272 Ibid., p. 188.
273 See Ibid., p. 188.
274 See Ibid., p. 202. See Kiesler and Sproull (1982), p. 556 for scanning as a specialized form of information processing.
275 See Gerdin and Greve (2004), p. 322 and Donaldson (2001), p. 141ff. Yasai-Ardekani and Nystrom also followed this approach for their analysis of the contingency theory in the context of scanning. See Yasai-Ardekani and Nystrom (1996).
276 See also G 2.1.

Following the presentation of the underlying theory the contingency variables of the research model can be specified. Within the classical contingency approach environmental uncertainty is considered as the most important contingency variable because it essentially influences the design of organizations.[277] The strong influence of this variable was also analyzed in numerous empirical studies in the context of early warning[278] and YASAI-ARDEKANI and NYSTROM empirically showed that environmental uncertainty is the contingency variable which mostly influences scanning behavior.[279] These studies are followed and will take environmental uncertainty, measured by perceived strategic uncertainty,[280] as the contingency variable to be analyzed. Additionally, the model of LEWIN and STEPHENS will be applied with its eight attitudes as contingency variables that influence early warning behavior. They are locus of control, tolerance for ambiguity, need for achievement, risk propensity, egalitarianism, moral reasoning, Machiavellianism and trust in people.

In the following, the design variables of early warning behavior and then the measures of success will be derived. Finally, the entire research model will be presented.

4.2 Selection of Design Variables of Early Warning Behavior and Success Measures

As seen above, early warning behavior comprises two steps: the process of scanning and interpretation. Scanning has already been analyzed empirically and literature has applied standardized design variables to describe it. These variables will be presented in the following section. On the other hand, interpretation has not yet been examined empirically in a large sample. Therefore, the relevant design variables of interpretation have to be developed. They will be presented in the second section.

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277 See Burns and Stalker (1961), Child (1975), Bourgeois, McAllister and Mitchel (1978), Argote (1982) and Lawrence and Lorsch (1967).

278 See Aguilar (1967), Daft, Sormunen and Parks (1988), Sawyerr (1993), Auster and Choo (1993), Yasai-Ardekani and Nystrom (1996), Elenkov (1997) and May, Stewart and Sweo (2000).

279 See Yasai-Ardekani and Nystrom (1996), p. 198.

280 See D 1.

4.2.1 Scanning

The description of scanning behavior via design variables has already often been used for empirical research.[281] Table 1 shows the result of the review of literature concerning relevant studies. Only studies which analyze individual scanning behavior in large samples are listed below with the design variables they examined.

	Frequency	Sources	Scope	Delegation
AGUILAR (1967)	●	●		
FARH et al. (1984)	●		●	
DAFT et al. (1988)	●	●		
AUSTER and CHOO (1993)	●	●		
SAWYERR (1993)	●	●		
FISHER (1996)	●		●	
YASAI-ARDEKANI and NYSTROM (1996)	●	●	●	●
ELENKOV (1997)	●	●		
MAY et al. (2000)	●	●		
MCGEE and SAWYERR (2003)	●	●		

Table 1: Examined Design Variables of Scanning in Empirical Works

This study follows the most extensive approach applied by YASAI-ARDEKANI and NYSTROM, who consider scanning frequency, sources of scanning, scope of scanning and degree of delegation.[282]

Scanning frequency is the number of times managers detect data about the environment useful for the anticipation of risks and chances for the organization.[283] This data is derived from **scanning sources**. First, the sources can be differentiated by looking at the organizational boundary[284] because data can originate from the outside as well as from the inside of an organization.[285] Examples of outside sources are customers, suppliers, trade shows, television news; examples of inside sources are subordinates, peers, internal reports and databases.[286] Additionally, sources can be

[281] See Aguilar (1967), Daft, Sormunen and Parks (1988), Sawyerr (1993), Yasai-Ardekani and Nystrom (1996) and Elenkov (1997).
[282] See Yasai-Ardekani and Nystrom (1996).
[283] See Hambrick (1981), p. 305, Hambrick (1982), p. 163, Farh, Hoffmann and Hegarty (1984), p. 203, Daft, Sormunen and Parks (1988), p. 125 and Elenkov (1997), p. 293.
[284] See Aldrich and Herker (1977), p. 218ff.
[285] See Aguilar (1967), p. 63f.
[286] See Ibid., p. 64f., Elenkov (1997), p. 294 and Daft, Sormunen and Parks (1988), p. 126.

divided into personal and impersonal sources[287] such as publications or the output of management information systems.[288] Considering these two criteria of classifying sources this study arrives at four basic sources (internal, personal sources; internal, impersonal sources; external, personal sources and external, impersonal sources) and four composite sources (external, internal, personal and impersonal sources). Figure 12 gives an overview about the classification of scanning sources:

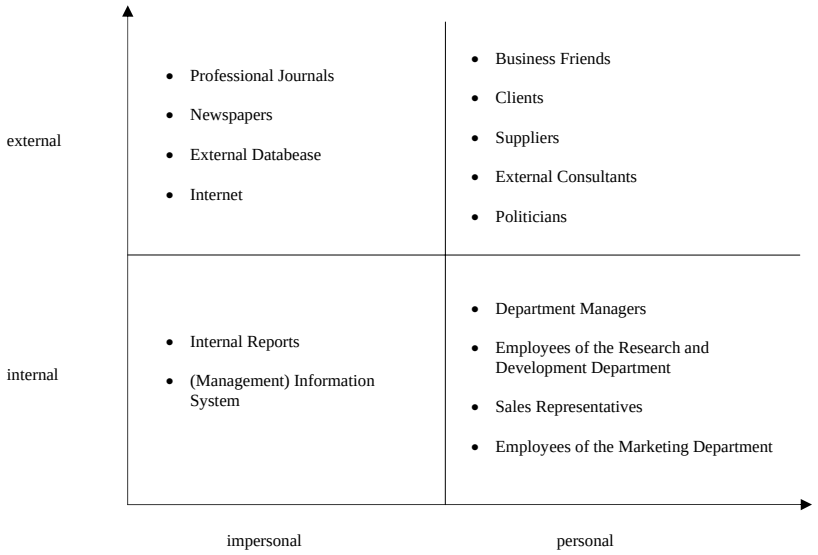

Figure 12: Classification of Scanning Sources[289]

Scanning behavior differs also concerning **scope**. Executives can have a broad scanning focus and look at a number of environmental sectors or they scan in a

[287] See Aguilar (1967), p. 64, Culnan (1983), Rhyne (1985), p. 323 and Daft, Sormunen and Parks (1988), p. 126 and Elenkov (1997), p. 294.

[288] See Aguilar (1967), p. 65, Kefalas and Schoderbek (1973), p. 66 and Smeltzer, Fann and Nikolaisen (1988), p. 60.

[289] Own compilation. A similar overview is provided by Aguilar (1967), p. 66.

narrowly focused way.[290] The last design variable of scanning is **degree of delegation**. Managers can perform the task of scanning on their own or delegate it to others.[291]

4.2.2 Interpretation

The design variables for interpretation are formally deduced because "research into environment-structure relationships gives scant attention to interpretation"[292] and therefore no established framework can be adopted.[293] Figure 13 shows how dimensions of interpretation are deduced.

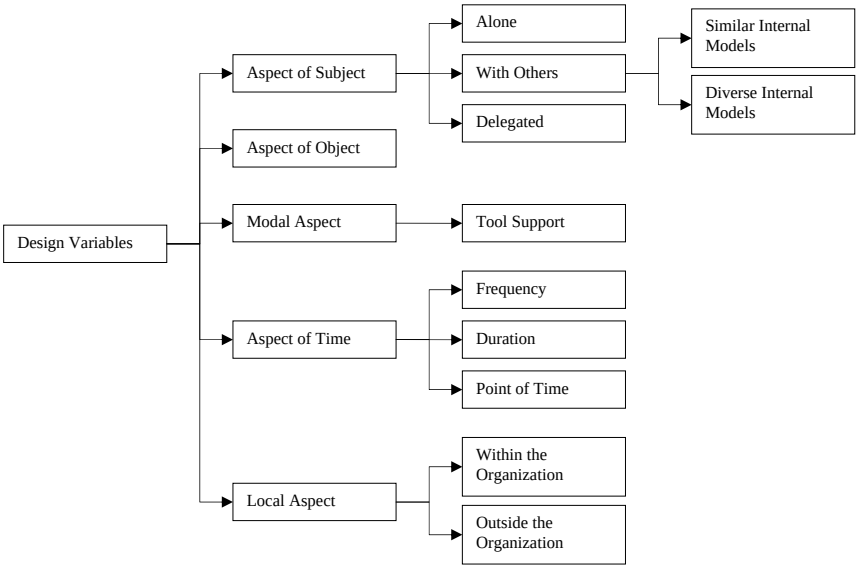

Figure 13: Formal Deduction of Design Variables of Interpretation[294]

From these exhaustive aspects of interpretation the design variables are deduced. The person who interprets corresponds to the aspect of subject. The interpretation can be

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290 See Yasai-Ardekani and Nystrom (1996), p. 189.
291 See Ibid., p. 189f. and Choudhury and Sampler (1997), p. 27f.
292 Daft and Weick (1984), p. 293.
293 Only the possibility of a change in the environment is interpreted to be a threat or an opportunity is analyzed in related studies. See Mintzberg, Raisinghani and Théorêt (1976), Nutt (1984), Dutton and Duncan (1987) and Thomas and McDaniel (1990). Additionally, Martins and Kambil analyze a personal bias in managers' interpretation of new information technology. See Martins and Kambil (1999). See also Dentson, Dutton, Kahn and Hart (1996), Sharma (2000) and Gioia and Thomas (1996).
294 Own compilation.

done alone, with others or it can be delegated. "Many participants may play some part in scanning or data processing, but the point at which data converges and is interpreted for organizational level action is assumed to be at the top manager level."[295] Therefore, it is sufficient to consider the two possibilities of interpreting alone or with others. This last kind of interpretation is directly related to the concept of internal models.[296] They can be considered as glasses through which a person looks at himself and at the world.[297] "Mental models [i.e. internal models] are deeply ingrained assumptions, generalizations, or even pictures or images that influence how we understand the world and how we take action."[298] These models reduce complexity and make personal action possible.[299] The design variable **diversity of internal models** within the process of interpretation comprises both ways of interpretation mentioned above. Interpreting by itself means that the diversity of internal models within the process of interpretation is very low. On the other hand, interpreting with others can signify that the executive involves a lot of different people with different internal models to interpret data gathered by scanning, or that the executive only interprets together with very few people who have similar internal models. This difference is reflected by high and low values of diversity of internal models within the process of interpretation.

From the aspect of object no design variable is deduced. As seen in the introductory part about early warning behavior, the object of interpretation is to obtain data by scanning.[300] Therefore, no additional design variable is needed.

The modal aspect is reflected by the **degree of tool support**. Within the context of early warning, there is a wide range of instruments to interpret data concerning future trends. With a long time horizon, no traditional instruments are of interest. Therefore, the focus is on scenario-analysis which is mostly applied in this context.[301]

From the aspect of time two design variables are deduced. There are three dimensions of time: frequency, duration and point of time. To accomplish the purpose of this study, duration of interpretation does not have to be considered because the question

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295 Daft and Weick (1984), p. 285.
296 For a detailed presentation of internal models see Schäffer (2001), p. 107ff.
297 Johnson-Laird (1983), p. 3f. "Like a pane of glass framing and subtly distorting our vision, mental models determine what we see." Senge (1992), p. 235. See also Kim (1993), p. 39.
298 Senge (1992), p. 8. See also Krieg (1971), p. 81.
299 See Weber, Grothe and Schäffer (2000), p. 241.
300 See Daft and Weick (1984), p. 286.
301 See Herzhoff (2004), p. 162. For the importance of this instrument see Leemhuis (1985), Schoemaker (1995) and Tessun (1997).

about duration of interpretation does not make sense within the context of early warning and therefore no hypotheses concerning the duration of interpretation can be found in literature. Frequency of interpretation is reflected by the design variable **intensity of interpretation**. This notion is selected because within the context of interpretation the main component of intensity is frequency. The final design variable is **fixity of time for interpretation**. It is deduced from the last aspect of time: point in time of interpretation. Executives can have fixed dates for the interpretation of data, e.g. every first day of the month, or they do not have a specifically assigned point of time.

4.2.3 Measures of Success

Success is measured first specifically by the success or the effectiveness of early warning. Additionally, the overall success of the organization, measured by the economic success, is considered. **Success of early warning** or early warning effectiveness means that the objective of early warning is realized, i.e. the detection of relevant potential risks and chances at a point of time which is so early that the organization still can react.[302] **Economic success** means the overall success of the organization. The relevant aspects of this success will be discussed in E 4.2.

4.3 Research Model

After the deduction of the design variables of early warning behavior, the research model can be presented. As seen above, the theoretical background of this work is the classical contingency theory. Therefore the influence of the environment is analyzed – in this case the uncertainty of it, measured by perceived strategic uncertainty[303] – on the design variables of early warning. In addition to that, the extension of the contingency theory proposed by LEWIN and STEPHENS is examined. They postulate a relationship between eight attitudes of the individual and the design variables of early warning.[304] According to the contingency theory, the alignment of the design variables with the environment leads to success. This is analyzed by success of early warning and economic success. Figure 14 shows the complete research model:

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302 See Yasai-Ardekani and Nystrom (1996), p. 194.
303 See D 1.
304 See Lewin and Stephens (1994), p. 188.

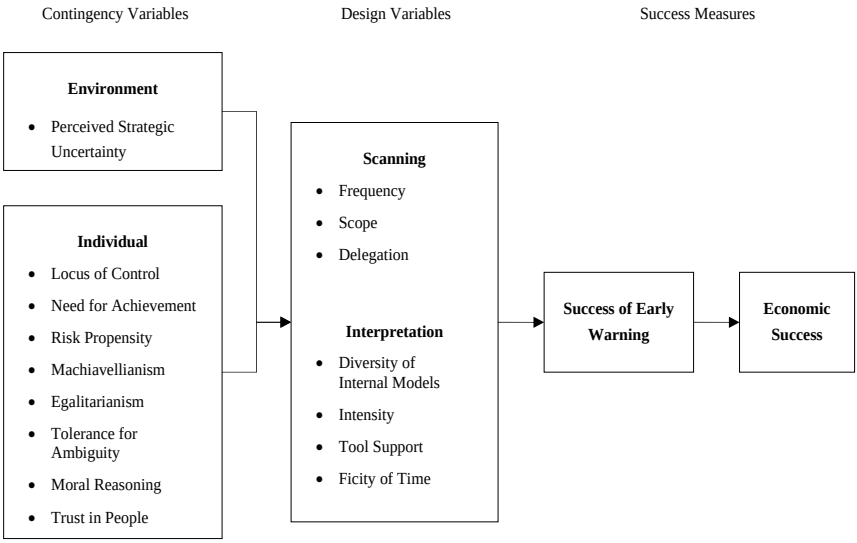

Figure 14: Research Model

The following section will examine which aspects of the research model have been empirically analyzed so far.

5 State of Empirical Research

Information processing, defined as "the gathering, interpreting [of data], and synthesis of information"[305] relevant to organizational decision making has been analyzed by various empirical works within a contingency context. In these analyses the processing of information of the individual or within the organization as a whole is studied. Most of the studies focus on individual behavior. Only the works of GALBRAITH[306] and LEIFER and HUBER[307] analyze information processing behavior of an entire organization. Moreover, all of these empirical studies can be characterized by the analyzed contingency variables, design variables and the nature of the analyzed relationships. The contingency variable analyzed most is the uncertainty of the environment. This contingency variable is operationalized by environmental

[305] Tushman and Nadler (1978), p. 614.
[306] See Galbraith (1977).
[307] See Leifer and Huber (1976).

uncertainty[308] and by the subjective impression of environmental uncertainty, perceived strategic uncertainty.[309] As for the selection of contingency variables two studies have to be stressed. YASAI-ARDEKANI and NYSTROM do not focus on one single contingency variable but test a broad range of contingency variables such as environmental change, organizational size and technological inflexibility. They show that environmental uncertainty is the contingency variable that influences scanning behavior the most.[310] FISHER's is the only work testing the influence of a personal attitude on information processing. She tests the relationship between locus of control and perceived usefulness of data. All empirical studies focus on the relationship between design variables of scanning. Sources of scanning are the design variables analyzed most often. The most complete list of design variables of scanning was analyzed by YASAI-ARDEKANI and NYSTROM who, apart from sources, considered scope and delegation of scanning. No work empirically analyzes the step of interpretation. The final criterion to characterize the empirical studies is the nature of the analyzed hypotheses. Except for two studies simple causal relationships between contingency variables and the design variables of scanning are analyzed by means of regression analysis. Only GARG et al. and YASAI-ARDEKANI and NYSTROM analyze optimal fit hypotheses. YASAI-ARDEKANI and NYSTROM followed the classical contingency approach and analyzed whether a relationship between a contingency variable and a design variable occurred to a higher extent in the case of organizations with high scanning effectiveness than in the case of organizations with low scanning effectiveness.

Considering the state of research on the basis of the here used research model a research gap is discovered. The extension of the classical contingency approach, the influence of personal attitudes on organizational structure, has not been tested yet. Also, the step of interpretation has not been analyzed yet. Exactly this gap will be closed with this empirical investigation.

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308 See Aguilar (1967), Auster and Choo (1993), May, Stewart and Sweo (2000) and McGee and Sawyerr (2003).

309 See Daft, Sormunen and Parks (1988), Sawyerr (1993) and Elenkov (1997).

310 See Yasai-Ardekani and Nystrom (1996), p. 196.

An overview of the empirical studies is provided in table 2.

Author/s (year)	**Data and Method**	**Analysis**	**Level**
AGUILAR (1967)	137 top and middle managers within the industrial manufacturing industry with a focus on pharmaceutical companies; questionnaires; correlation analysis	Relationship between environmental uncertainty and use of four scanning sources	I
KHANDWALLA (1972)	CEOs of 92 companies; questionnaires; correlation analysis	Relationship between quality of competition and use of data	I
LEIFER and HUBER (1976)	12 work units within a health and welfare organization; field study	Relationship between perceived environmental uncertainty and scanning frequency	O
GALBRAITH (1977)	Metastudy and various case-studies, e.g. within the aircraft production industry	Relationship between task uncertainty and information processing	O
DAFT et al. (1988)	50 medium-sized North-American manufacturing companies; questionnaires; correlation analysis	Relationship between perceived strategic uncertainty and scanning frequency, use of four scanning sources	I
AUSTER and CHOO (1993)	115 Canadian CEOs in the telecommunications and publishing industries; questionnaires; correlation analysis	Relationship between environmental uncertainty and scanning frequency, use of scanning sources	I
SAWYERR (1993)	CEOs of 47 manufacturing firms in Nigeria; questionnaires; correlation analysis	Relationship between perceived strategic uncertainty and scanning frequency, use of four scanning sources	I
FISHER (1996)	98 managers of Australian companies grouped in nine industries; questionnaires; ordinary least square regression	Relationship between locus of control and perceived usefulness of data	I
YASAI-ARDEKANI and NYSTROM (1996)	100 North American business organizations; questionnaires; multiple regression with dummy variables	Relationship and optimal fit between the contingency variables environmental change, organizational size, technological inflexibility, the organization's orientation toward low cost and the design variables scanning frequency, scope and delegation of scanning	I
ELENKOV (1997)	Managers of 141 medium-sized Bulgarian manufacturing and sales companies; questionnaires; correlation analysis	Relationship between perceived strategic uncertainty and scanning frequency, use of four scanning sources	I
MAY et al. (2000)	96 Russian Managers of medium and large organizations; questionnaires; regression analysis	Relationship between environmental uncertainty and four scanning sources	I
MCGEE and SAWYERR (2003)	CEOs of 153 small high-technology manufacturing firms; questionnaires; correlation analysis	Relationship between environmental uncertainty and use of four scanning sources	I
GARG et al. (2003)	105 CEOs of North-American single business manufacturing firms with 50 to 99 employees; questionnaire; hierarchical and multiple regression	Optimal fit between the contingency variables environmental dynamism in the internal and external environment and scanning focus per sector	I
I = Individual; O = Organizational			

Table 2: Literature Overview of Studies Dealing with Information Processing within a Contingency Context

After the presentation of the underlying theory of this work, the deduction of the research model and the literature review, now hypotheses can be deduced.