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DOES ORGANIZATION STRUCTURE MATTER?
On the relationship between the structure, functioning and effectiveness

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Abstract:

Managers often see new organizational designs as the solution to many problems. This paper explores the relationship between organization structure (design), functioning of organizations, and effectiveness. A study of 320 companies showed that the structural variable decentralization marginally affected the way in which organizations function. Functional variables had a minor impact on profitability. No direct relationship between structure and effectiveness was found. When functioning is conceptualized as a mediating factor no direct causality between structure and effectiveness is implied, but a relationship between structure, function and effectiveness. To improve effectiveness, reorganizing is probably not the first option to consider.

Key words: Organization structure, function, organizational effectiveness

1. Introduction

It appears that organizations are turning toward reorganizing more and more often. A new structure is chosen because it is assumed that it will make the organization more successful and effective (e.g., Burton and Obel 1984; Baligh, Burton and Obel, 1996). For many managers operating in turbulent environments, the design of the organization itself has emerged as a new strategic variable (Daft and Lewin, 1993). New organization forms open up new sources of sustained competitive advantage (ibid.). In our changing world, management sees new organization structure as the solution to many problems. However, few organizations have succeeded in finding organization structures leading to competitiveness, success and effectiveness. The issue addressed here is whether or not organizations can become more effective by reorganizing, and if so, how this can be achieved.

Organizational design is a normative science that focuses on creating an organization to obtain given goals (Burton and Obel, 1998). Research on organization structure has dealt with concepts, definitions and dimensions of structure. Configuration theories posit higher effectiveness for organizations that resemble one of the ideal types defined in the theory. Effectiveness is attributed to the internal consistency among the patterns of relevant contextual, structural, and strategic factors. Two contributions to configuration theories have enjoyed widespread popularity but limited empirical support, namely Mintzberg's (1979, 1983) theory of organization structure and Miles and Snow's (1978) theory of strategy, structure, and process.

This study challenges the logical and empirical support for the contention that organization structure directly impacts organizational effectiveness. Effectiveness concerns outcomes and goals. Results can only be achieved by human action. If organization structure has an impact on effectiveness it must be due to human actions and efforts being influenced by the structure in the first place. Consequently, this paper explores the relationship between organization structure (how organizations are meant to be) and the functioning of organizations (what is done in organizations). Subsequently, the relationship between the functioning of organizations and their effectiveness (how well it is done) is explored.

Thus, the objectives of this paper are twofold. The first aim is to provide theoretical arguments on the overall relationship between organization structure and organizational effectiveness. We suggest a relationship from the independent variable structure (design) to the dependent variable effectiveness with functioning as a moderating or intermediate variable. We also present arguments demonstrating a link between the structure and the functioning of the organization. Finally, arguments are presented related to the relationship between the functioning of the organization and organizational effectiveness. These arguments - as hypotheses - are empirically tested, which is the second purpose of the study.

The study does not aim at testing specific theories that suggest explanations for the relationship between structure and effectiveness. The purpose is rather to investigate the relationship between structure, function and effectiveness.

The three main concepts and variables are *organization structure* (defined as the division of work and authority), *function* (defined as the activities or what people do at work), and *organizational effectiveness* (defined as the degree of profitability).

2. On Structure, Function and Effectiveness

The term *organization structure* refers to the division of work and division of authority in organizations. Robbins (1990) describes the concept of structure by using a taxonomy consisting of three elements: specialization (complexity), formalization, and centralization/decentralization. In each of these elements we find varying degrees of the basic dimensions of division of work and division of authority.

Specialization (complexity) can be subdivided into three: Horizontal differentiation, vertical differentiation and spatial differentiation. Horizontal differentiation describes how many jobs, professions and specialities we find amongst the employees. It also describes how much special training and education is given by the organization related to specific tasks. Finally, it describes the degree of departmentalization. The more jobs, professions, and specialities, the more specific training and more departments (sections, groups, and divisions) we find in an organization the more complex it is. Vertical differentiation concerns how many levels, that is, how pointed or flat the "pyramid" is. The fewer the number of levels, the greater is the span of control for each manager. Spatial differentiation has to do with the physical location of the organization and its departments and people. The greater the distance between them, the more complex is the organization.

Formalization describes the degree to which work and tasks performed in the organization are standardized. It has to do with how much of the activity is regulated or managed through rules, routines, and procedures.

Centralization/decentralization denotes where in the organization decisions are made. Who has the authority and power to make decisions? Maximum centralization implies decisions taken at the highest level possible while maximum decentralization means that decisions are taken at the lowest level possible.

All organization structures (designs) can be expressed in these terms. The degrees of complexity, formalization and centralization/decentralization vary in organizations. Nevertheless, these dimensions are found in all organizations. In this study the structural dimensions of specialization, formalization and decentralization have been investigated. So far we have only dealt with the structure of the organization.

The term *function* in an organization signifies an organization's activities, that is, the deployment of the organization's resources (human, material and financial) as

they are used to attain organizational goals. The concept of function in organization theory captures the activities of the people in the organization. The number of activities is a structural dimension (Burton, Minton and Obel, 1991) while activity is a functional concept. The functional dimensions are primarily described by verbs, viz., what people are doing at work. Employees do not always perform the tasks they are formally given. They do not always follow the rules and procedures nor do they necessarily make the decisions they are authorized to make. The functional dimensions focus on *what* people are doing at work and *not why* they do it.

A high degree of consensus is found in organization literature regarding the structural dimensions of specialization, formalization and centralization. The actual definitions and measurements of the structural variables in the survey instrument (appendix) are quite similar to those proposed by Mintzberg (1979), Robbins (1990), and applied by Doty et al. (1993) as well as by Miller and Vollmann (1984). When it comes to functional variables no such consensus is found. Richardson, Vandenberg, Blum and Roman (2002) point out that researchers have used and suggested almost an infinite variety of organizational factors, and from theory no clear set of factors are derivable. In this study the functional dimensions of integration, empowerment, training, group dynamics, leadership, and inter-functional teams have been investigated. These functional variables were proposed and applied in research by Sakakibara, Flynn and Schroeder (1993) and Flynn, Schroeder and Sakakibara (1994).

Profitability can be seen as the major criterion of *effectiveness* for private enterprises. The ultimate goal of a company is profitability (degree of return on assets) (Shetty, 1979; Nash, 1983; Walton and Dawson, 2001). Profitability is the most conventional measure of current business performance (Hambrick, 1983) and is used in this study.

2.1 Previous research

A study by Khandwalla (1973) of 79 Canadian companies contains definitions and measurement of organizational variables, which are not the same as the ones used in this study. Khandwalla (ibid.) makes no sharp distinction between structural and functional variables. The calculation of profitability is different from the one used here. Khandwalla (1973) found only extremely small or negative correlation coefficients between the structural and functional variables and profitability. None of the correlations between profitability and the other seven organizational variables are statistically significant. The data suggest that these variables may not, taken individually, contribute much to profitability (ibid.).

Eriksen (2000) investigated 236 medium-sized manufacturing and service firms in Denmark. Amongst the factors analyzed were the structural factor "rule orientation" (formalization) and the functional factor "management control." Effectiveness was defined as the return on assets submitted by the companies investigated during 1996 and 1997. He found that the correlation coefficients between the structural factor "rule orientation" and effectiveness (return on assets) was .02 in 1996 and .00 in 1997. The correlation coefficient between the structural factor "rule orientation" and the functional factor "management control" was .29. The correlation between the functional factor "management control" and effectiveness was .08 in 1996 and .02 in 1997. Ezzamel, Morris and Smith (2003) found, when investigating 64 private companies in UK, only negative, low and insignificant correlation coefficients for the relationship between organizational change, as perceived by the managers, and five performance indicators.

Harris and Ruefli (2000) investigated the financial performance impact of strategy and structure changes in 259 US firms. They found that singular structure changes were associated with the highest performance. This finding was consistent with the theory: though strategy is important, proper *deployment* of firm uniqueness is paramount to performance enhancement (ibid.). Harris and Ruefli (2000) view structure as a governance device acting as a fulcrum for managerial leverage in the deployment of firm resources. They maintain that embedded skills are *unleashed* through the governance structure overlaying firm resources (ibid.). These results, reflecting managers' revealed preferences, suggest that the choices made may represent the desire to *exploit* core skills by changing only structure. Moreover, the deployment of such unique firm assets is vital (ibid.) (our italics). It is evident from Harris and Ruefli (2000) that they do not distinguish between structural and functional variables. Deployment of resources, unleashing potential and utilizing skills are in most treatises regarded as functional variables. Thus, the arguments presented by Harris and Ruefli (2000) are in fact arguments supporting the idea that it is the functioning of the organization (the deployment of the resources), which impact organizational performance. Feldman and Rafaeli (2002) view organizational routines as recurrent patterns of behavior of multiple organizational members involved in performing organizational tasks. This concept is a functional concept as it concerns behavior and consequently not a structural one.

Harris and Ruefli (2000) claim that firms that held their strategy constant and made only structure changes outperformed firms that changed neither strategy nor structure. The conclusions drawn by Harris and Ruefli (2000) seem to suggest that it does not matter to which organization form the changes is made. It is the effects of change that they have observed? Is their conclusion that all organizational designs are effective? If it is the change itself the logical conclusion must be that the change affects the functioning (deployment) of the organization. Harris and Ruefli (2000) have not investigated the relationship between structure and effectiveness.

Richardson et al. (2002) examined whether the relationship between decentralization and organizational outcomes is contingent on contextual organizational characteristics by using data from 450 US health treatment centers. They investigated two categories of contexts, organizational characteristics and environmental characteristics. Richardson et al. (2002) state that the primary expectation has been that decentralization will positively influence organizational functioning even though they did not investigate functional variables but rather some variables that may influence behavior like employee attitudes, adaptability, motivation and aspirations. The five factors that Richardson et al. (2002) related to performance are not the same applied in this study. The financial performance measure used by Richardson et al. (2002) is not return on assets or return on investment or profitability. Richardson et al. (2002) did not find decentralization to be significantly related to performance.

Love et al. (2002) explored the relationship between articulated strategy and firm performance by introducing centralization of authority as a context variable. They found support for their hypothesis that the effect of explicit strategies on performance is moderated by structural centralization based on data from 95 US manufacturing firms. Love et al. (ibid.) found very weak and insignificant correlations between all five performance measures and structure. The degree of centralization did not explain significant variances in performance beyond that explained by the control variables (ibid.). When testing the multicontingency model with data from 224 Danish companies Burton, Lauridsen and Obel (2002) found that only 6% of the companies had no situational and contingency misfits. These firms suffered no return on assets loss (were profitable).

In some of the previous studies no distinction is made between the structural and functional variables. Some studies have focus on strategy or strategic change related to structure. Other studies on strategy do not include the functional variables or the performance, profitability or effectiveness variables. Previous research also differs regarding the way in which the structural, functional and performance variables are measured.

2.2. The relationship between structure and functioning

The choice of organization structure is assumed to have direct consequences for the functioning of the organization. Powell (1990, p. 319) claims "the design of organizations can affect the behavior of their members in a number of powerful ways." No evidence is given to support this claim. Some writers also assume that organizational models make organizations effective, but not directly. They assume that the structure will decide how the organization will function.

To what degree do organization structures determine the way in which organizations function? Organization structure describes the division of work, which is more or less clearly defined by the degree of *specialization* stating what tasks each individual in the organization has to do. The organization may, however, function in another way. Employees do not do all tasks or more tasks than they are supposed to do. The structural dimension of *formalization* describes the degree to which work and tasks performed is regulated or controlled by rules, routines, and procedures. The employees may not follow the rules strictly or follow only some of them. Conversely, the employees may apply the rules with rigidity or follow their own informal rules and procedures. The term *centralization/decentralization* describes who has the authority to make decisions. People may not avail themselves of the authority they have been granted to make decisions. Again, people may make decisions and may act outside their authority (Andersen, 2002).

Ferner (2000) reminds us that the existence of formal systems does not mean they will be implemented in practice. Systems may operate ineffectually or have fallen into disuse (ibid.). Feldman and Rafaeli (2002) point out that much of the study of routines has focused on routines in the abstract rather than routines as they are performed. Variations in behavior, even when organizational routines prescribe specific behaviors, are inevitable (ibid.).

Organization structure is, according to Hales (1999), a configuration of mechanisms, which are intended to operate as constraints on, demands for, inducements to and opportunities for particular forms of behavior. Underlying these are assumptions about how organizational members would behave were it not for the existence of these constraints, inducements or opportunities (ibid.). Hales (1999) deals with the relationship between the organizational dimension of decentralization and managerial behavior. His arguments are, however, valid for the general relationship between organization structure and behavior in organizations. Evidence of decentralization's effects on managerial behavior is surprisingly scant and, at best, equivocal (Hales, 1999). Hales shows that these assumptions are open to a number of doubts and counter-arguments as well as lacking in firm empirical support (ibid.).

Merton (1957, p. 199) writes, "adherence to the rules, originally conceived as a means, becomes transformed into an end-in-itself." What Merton saw was people in organizations developing an over-conformity to the rules or what he called a trained incapacity. Gouldner (1954) found that supervisory personnel often allowed subordinates to bypass many rules and requirements. In his study of a state unemployment agency, Blau (1955) reports various forms of innovation and

adjustment that deviated from the prescribed rules and procedures. McGuigan and Henderson (2005) drew similar conclusions, and emphasized the importance of risk taking individuals for creating an innovative environment. One reason for this is that "individuals have self interest as well as organizational concerns" (Burton and Obel, 1998, p. 9).

There is often an unpredictable human reaction to organizational initiatives. The intended purposes of organization structures often go unrealized because they create unexpected and counterproductive consequences. Like Gouldner, Blau noted that many bureaucratic procedures and routines were seen by subordinates and managers as annoyances to be avoided rather than guidelines to be obeyed (Jaffee, 2001). The recourse to the informal precepts often observed reflects the recognition that formal-rational structural principles are insufficient means for the generation of compliance. Formal structural prescriptions for the functioning of the organization are, by themselves, inadequate. Jaffee (2001, p. 108) writes, "a set of structural imperatives about the division of work and authority cannot be applied to organizations without a clearer sense of how these will affect organizational behavior."

The assumption that organization structure affects behavior in organizations is questioned theoretically as well as empirically. Consequently, the assumption that changes in organizational form induce changes in behavior (Hales, 1999) is also challenged. As we have seen, a number of arguments support the assumption that structure affects the functioning of the organization.

Khandwalla (1973) found only extremely small or negative correlation coefficients between the structural and functional variables. Eriksen (2000) reports a very low correlation coefficient between a structural dimension and a functional factor. However, previous studies differ in methods applied as well as in concepts and measurements used. Logical arguments and empirical results indicate that structure affects the way in which organizations function.

2.3. The relationship between functioning and effectiveness

Profitability can only be achieved through human action when people produce goods and services. For that simple reason there must be a link between functioning and effectiveness. The functioning of the organization is what employees do. The outcome of what people do at work affects productivity, effectiveness and profitability. The arguments presented by Harris and Ruefli (2000) support the idea that it is the functioning of the organization, which impact organizational performance. Khandwalla (1973) found only extremely small or negative correlation coefficients between the functional variables and profitability. Eriksen (2000) found a very low correlation between the functional factor "management control" and effectiveness. These arguments suggest that the functioning of the organization has an impact on profitability.

2.4. The relationship between structure and effectiveness

Some writers argue in favor of changing the structure (redesigning organizations). When Bobbitt and Ford (1980) describe the relationship between structure, context and effectiveness the functioning of the organization is not taken into consideration. Effectiveness is assumed to be a direct outcome of structure. It is assumed that the design of the organization affects the degree of effectiveness (e.g., Khandwalla, 1973; Daft, 1995). Baligh et al. (1996) assume that there are effective and efficient

organizational designs. Duncan (1979) claims that the right structure may have some direct impact on the effectiveness of the organization. He argues that the "best" structure is the one that "fits" the demands of the environment. Duncan (ibid.) does not establish empirically that the structure that fits the environment leads to organizational effectiveness in terms of goal attainment, but he argues that some designs are "better" than others. Decentralization is treated as "a means for realizing the larger goal of the organization and its management" according to Leana and Florkowski (1992, p. 245). Child (1972, p. 12) claims that "structural design is likely to have only limited effect upon the level of organizational performance achieved." Khandwalla (1973) found no significant correlations between organizational variables and profitability. Eriksen (2000) found almost no correlation between the structural factor formalization and effectiveness. Richardson et al. (2002) did not find decentralization to be significantly related to performance. Love et al. (2002) found very weak and insignificant correlations between structure and performance measures. These arguments suggest that there is no direct relationship between organization structure and effectiveness.

3. Hypotheses

As we have seen, some scholar present logical arguments positing *strong relationships* between structure and effectiveness or between structure and functioning (e.g., Harris and Ruefli, 2000; Burton and Obel, 1984; Baligh, Burton and Obel, 1996; Daft and Lewin, 1993; Mintzberg, 1979 and 1983; Miles and Snow, 1978; Powell, 1990; Bobbitt and Ford, 1980; Khandwalla, 1973; Daft, 1995; Baligh et al., 1996; Duncan, 1979; Leana and Florkowski, 1992).

Some researchers take another position when they present theoretical arguments for a *weak relationship* between structure and effectiveness or between structure and functioning (e.g., Gouldner, 1954; Blau, 1955; Merton, 1957; Child, 1972; Burton and Obel, 1998; Hales, 1999; Ferner, 2000; Jaffee, 2001; Andersen, 2002; Feldman and Rafaeli, 2002; McGuigan and Henderson, 2005). However, they do not support their stance with empirical evidence.

Other researchers in this field with empirical studies report *weak* and or *insignificant relationships* between these variable (e.g., Khandwalla, 1973); Eriksen, 2000); Ezzamel, Morris and Smith, 2003; Richardson et al., 2002; Love et al., 2002; Burton, Lauridsen and Obel, 2002). However, they do not present logical causes for these almost non-existing relationships. Based on theoretical and empirical arguments presented (sections 2.1 to 2.4) we posit a causal relationship between structure (independent variable) and effectiveness (dependent variable) with functioning as a moderating variable (figure 1), but no direct impact by structure on effectiveness. A number of theoretical arguments advocates strong relationships between these variables (and some propose weak relationships) while a number of empirical studies indicates insignificant or weak relationships. For these reasons the first two hypotheses have been less sharply formulated compared to the third hypothesis for which we found no empirical evidence in previous research.

H1: Organization structure affects the way in which organizations function.

H2: The functioning of the organization has an impact on organizational effectiveness.

H3: Structure has no direct impact organizational effectiveness.

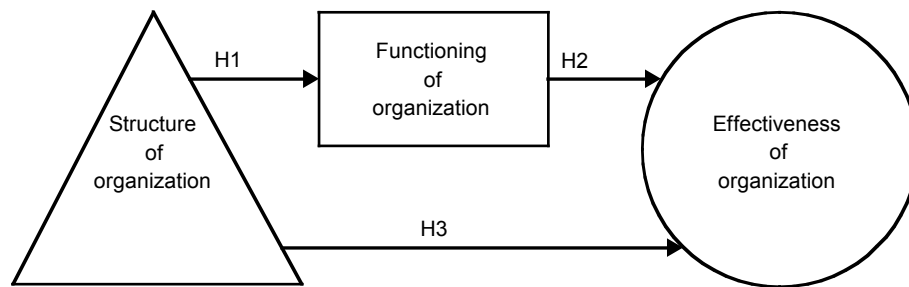


Fig. 1. The hypothesized relationships between structure, function and effectiveness.

4. Method

4.1 Sample

Data was collected through a mailed survey to manufacturing companies in the metal-working sector (U.S. SIC 33-37/ European SIC 27, 28, 29, 31, 35; Primary metals, fabricated metals, machinery except electrical, electric and electronic equipment and transportation equipment) in Sweden. This is a quite homogenous group of manufacturing industries that is represented by a relatively large number of Swedish companies. Therefore, the selected industries should provide a good setting for the present study. Only plants with more than fifty employees were included in the survey. As in Hambrick's study, each business – often a division – is a distinct product-market unit (Hambrick, 1983). The questionnaire was sent to 892 companies, representing the total population of this industry in Sweden. The questions focused on one specific function in the companies – the manufacturing function. In order to reach a person with enough seniority and manufacturing knowledge to give reliable answers to the questions, the survey was addressed to the person with the highest position in manufacturing, i.e. the production manager.

A total of 324 usable responses were received (a response rate of 36 percent of the total population). To check the reliability of the answers provided by the respondents, a second response from another individual in the plant was obtained. The questionnaire sent to the production managers included a section where they were asked to name another individual within the organization who they considered being suitable for and could answer the same questions in reliable ways. They were also told not to discuss the questions and answers with the second respondent before both had answered to the survey questions. Eighty-five first-respondents gave the names of other potential informants and a new copy of the questionnaire was sent to them. Forty-seven responses were received from this sample (a second-response rate of 57 percent). The multiple answers were matched and analyzed in the inter-rater reliability test discussed later in the paper. Therefore, the single informant problem discussed by Doty, Glick and Huber (1993) is partly avoided in this study. The profile of the samples and respondents is presented in tables 1 and 2.

Table 1. Sample and respondents by industry

Industry code	Sample	Res- ponses	Per cent received	Expected response	Response rate
27. Primary metal	95	34	10.5	34	36.8
28. Fabricated metal	573	149	46.0	208	26.0
29. Machinery, ex. electrical	145	76	23.5	53	52.4
31. Electronic equipment	50	36	11.1	18	72.0
35. Transportation equipment	29	28	8.6	10	96.6
99. Other	0	1	0.3	0	0
Total	892	324	100	324	36.3

Table 2. Sample and respondents by company size

No. of employees	Sample	Responses received	Per cent responses	Expected rate	Response
50-99	423	127	41.4	146	30.0
100-199	237	99	32.2	82	41.8
200-499	151	49	16.0	52	32.4
500-	81	32	10.4	28	39.5
Total	892	307	100.0	307	34.4

Plants in the fabricated metal industry and plants with 50 to 99 employees are dominant in the sample, which corresponds well with the total population. The response rates differ between the five industries investigated. It is, however, not considered to be critical, since the definitions of the industries are rather similar. Consequently, the sample ought to be reasonably representative of the metal-fabricating industries in Sweden.

4.2 The Survey Instrument

The survey instrument is presented in the appendix. Effectiveness, structure and functioning were defined and measured by using 11 measures. Profit and Growth measure the variable "Organizational effectiveness". The variable "Organization structure" is measured by the dimensions of Decentralization, Job specialization and Formalization. Worker empowerment, Soft integration, Training, Group dynamics, Quality leadership and Inter-functional design teams measure the variable "Functioning". Technology and Size are introduced as control variables. A 7 point Likert scale from "significantly lower" to "significantly higher" was applied to measure most variables. The effectiveness variable consists of the two measures of "profit" and "growth" in line with the reasoning of Doty et al. (1993) and Boyer, Ward and Leong (1996). To measure firm performance, Love, Priem and Lumpkin (2002) used multiple measures of firm performance to reflect the multi-dimensionality of the performance construct. Respondents were asked to rate their firm's performance compared to other similar firms on sales growth, return on sales, return on total assets, and overall performance/success. Hambrick (1983) defined performance as profitability (return on investment, cash flow and market share

change). All performance measures are prominent in the literature and they can be considered valid measures for testing the hypotheses (ibid.).

Three tests of reliability were carried out: (1) non-respondent bias, (2) inter-item reliability within the scales, and (3) inter-rater reliability between multiple respondents. All tests indicated that the measures and data were appropriate. One hundred and one of the non-respondents were followed up and asked for the reason for non-responding. Forty-six percent of those had no production and were, consequently, not relevant respondents.

Cronbach's coefficient alpha is the most widely used measure for testing inter-item reliability when using scales of individual measures (Sakakibara et al., 1993). It measures the internal consistency within a particular scale, by calculating an average of the correlation coefficient of each item within a scale with every other item, as weighted by the number of items within a scale. Values of .70 or higher are considered acceptable (e.g., Flynn et al., 1994). Factor analysis using principal components showed that all scales except for decentralization, worker empowerment and soft integration loaded on single factors with eigenvalues larger than one and most loadings in the 0.70 to 0.90 range. After deleting one to two items with factor loadings less than 0.4 (as discussed by e.g. Sakakibara et al., 1993) of those scales they loaded on single factors. The inter-item reliability analysis using Cronbach's alpha indicated slightly better reliability after deleting these items, with all values higher than 0.70. The inter-item reliability of the scales is therefore considered acceptable (e.g. Flynn et al., 1994) (table 3).

Table 3. Constructs, scales and reliability coefficients of summated scales

Construct ¹	Mean (Std.Dev.)	Cronbach's Alpha	Inter-Rater Reliability
Decentralisation [A]	3.31 (0.67)	0.73	0.250
Formalisation [B]	5.83 (1.39)	NA	0.337*
Soft Integration [C]	4.53 (0.99)	0.73	0.462**
Worker Empowerment [D]	5.64 (0.79)	0.89	0.443**
Training [D]	4.70 (1.07)	0.80	0.671**
Small Group Problem Solving [D]	4.74 (1.37)	0.91	0.560**
Quality Leadership [E]	5.09 (0.97)	0.78	0.434**
Interfunctional Design Process [E]	4.57 (1.30)	0.81	0.473**
Profit [F]	4.72 (1.05)	0.90	0.445**
Growth [G]	4.88 (1.05)	NA	0.386*
Technology [C]	3.10 (1.00)	0.86	0.564**

Note: The scale was developed by: [A] Miller and Vollmann (1984), [B] Dean et al. (1992), [C] Boyer et al. (1997), [D] Sakakibara et al. (1993), [E] Flynn et al. (1994), [F] Vickery et al. (1993), [G] Swamidass and Newell (1987).

NA = Not Applicable

* Significant at the p<0.05 level

** Significant at the p<0.01 level

Kolmogorov-Smirnov statistics, with a Lilliefors significance correction for testing normality, indicates significant univariate normality for all variables.

¹ Scales used see appendix.

Inter-rater reliability measures the correlation between the first and second respondents of the same plant. It indicates the degree to which two independent respondents of the same plant agree on the ratings to a specific scale. The test for inter-rater reliability was first presented by James, Demaree and Wolf (1984) and

has since then been used sporadically in operations management research (e.g. Dean and Snell, 1991; Snell and Dean, 1992, Boyer et al., 1996, Boyer et al., 1997). All scales except for decentralization showed significant correlations at the $p < 0.01$ level between first and second respondents. To further test the inter-rater reliability of the decentralization variable a ninety-five percent confidence interval for the difference between the first and second raters was established. The interval included zero, indicating that the mean difference between the first and second raters differs from zero can be rejected at the $p < 0.05$ level.

To establish a high degree of content and construct validity we followed the recommendations of Flynn, Sakakibara, Schroeder, Bates and Flynn (1990) to draw the scales directly from existing sources and to base new scales on extensive literature review. Most items that were used had been tested and used in U.S. studies (e.g., Boyer et al., 1996). The items were translated into Swedish. The entire questionnaire was pre-tested before it was sent to the respondents. The formulation of some questions was subject to alteration. Content validity is subjective in nature and can always be debated. Construct validity, on the other hand, was tested by using factor analysis (Jonsson, 2000). This test led to deletion of some of the original variables. Consequently, all used scales load on single factors. Criterion-related (predictive) validity assesses the relationship between scores on a predictor scale and an objective outcome criterion.

5. Empirical Testing

By using the terms independent and dependent variables we aim at investigating causal relationships, which require the existence of a statistical relationship. In this case we investigate the existence of linear relationships between the variables as stated in the hypotheses using correlation and linear regression analyses. No significant difference in coefficients and probability figures occur in this data sample. All variables are tested for non-linear relationships. No curvilinear relationship is found. Profitability and growth were identified as effectiveness variables. Only profitability is used as dependent variable in the statistical tests. This is because we want to simplify the interpretation of the analysis and because the correlation between the variables profitability and growth is significant ($p < .01$) with a correlation coefficient of .48. The average value of the variable profit and its standard deviation (skewness and kurtosis-value less than 1) makes it reasonable to regard it having normal distribution. It may therefore be valid to perform the applied multivariate statistics.

5.1 Testing hypothesis One

Hypothesis One - that organization structure affects the way in which organizations function - is tested on the same sample. All correlation coefficients between structure and functioning variables are low (table 4). Thirteen out of 18 correlations are positive. The negative correlations concern the specialization variable. In thirteen of the cases the correlations are significant ($p < .05$). Decentralization is significantly correlated with all functioning variables. The two relationships with highest correlation coefficients were between "decentralization" and "group dynamics" and between "decentralization" and "training." Both are significant on the 1% level. Four additional correlations are significant on the 1% level. Those are decentralization linked to interfunctional design teams, and formalization linked to training, group dynamics and soft integration. These correlations indicate that there

are some relationships between organization structure and functioning, especially between the design variable decentralization and the functioning variables.

Table 4. Correlations between variables (N=307).

Size	Dec	Spec	Form	Qlead	Train	Interfunc	Group	Softint	Wemp	Dec x Train	Dec x Interfun	Dec x Group	Dec x Softint	Dec x Wemp	Profit	
.25**	.23**	.03	.29**	.20**	.39**	.33*	.41**	.32**	.38**	.41**	.37**	.41**	.37**	.38**		Tech
	.00	.05	.11	.07	.12*	.12*	.11*	.12*	.05	.08	.09	.08	.08	.02		Size
		-.02	.04	.13*	.20**	.17**	.29**	.14*	.19*	.74**	.67**	.73**	.74**	.86**	.02	Dec
			.01	-.05	.02	-.14*	-.08*	-.04	-.07	.01	-.10*	-.06	-.04	-.05	-.11	Spec
				.14*	.19**	.13*	.19**	.18**	.10	.15**	.12*	.16**	.14*	.08	-.06	Form
					.45**	.45**	.44**	.27**	.29**	.38**	.39**	.36**	.25**	.24**	.25**	Qlead
						.42**	.53**	.27**	.40**	.79**	.42**	.47**	.30**	.36**	.24**	Train
							.55**	.28**	.32**	.39**	.83**	.47**	.28**	.29**	.19**	Interfunc
								.34**	.37**	.53**	.55**	.85**	.40**	.41**	.17**	Group
									.39**	.26**	.26**	.30**	.76**	.31**	.09	Softint
										.38**	.33**	.36**	.37**	.66**	.04	Wemp
											.71**	.77**	.66**	.77**		D x T
												.76**	.60**	.69**		D x I
													.68**	.75**		D x G
														.76**		D x S
																D x W

* p <.05; ** p<0.01

5.2 Testing hypothesis Two

Hypothesis Two says that the functioning of the organization affects profitability. When conducting bi-variate correlation analysis (table 4) only two functional variables have somewhat 'strong' positive and significant (p<.01) correlations with profit, namely 'quality leadership' and 'training'. It cannot be claimed – based on this analysis – that the functional variables investigated fully explain why organizations achieve profitability. All correlation coefficients are, however, positive and four of six are significant on the 1 or 5% levels.

In order to investigate any causal linear relationship between the functional variables and profitability, linear regression analysis was conducted. The analysis is conducted in several steps: (1) The natural logarithm of the total number of employees (the variable is called 'size') and the degree of investment in advanced

technology (the variable is called 'technology') were entered into the regression equation as control variables. These variables are considered to affect the performances of the studied companies, no matter the structure or function of the organization (e.g., Woodward, 1965). Love et al. (2002) used organizational size as a control variable in all their analyses. The use of the natural logarithm of the number of employees is consistent with previous research (e.g., Ettlé and Reza, 1992; Boyer, Leong, Ward and Krajewski, 1997). A logarithmic transformation is used because it results in a regression curve that is closer to linear than the original curve. (2) Next, the organizational functioning variable with highest bi-variate correlation with profitability is entered into the equation. (3) The organizational functioning variable with second highest correlation with profitability is entered. (4) Finally, the remaining organizational functioning variables with decreasing correlation with profitability are entered into the regression equation. The results from the regression analysis are shown in table 5. Previous studies indicate that the impact of manufacturing technology investments on the performance is higher for companies emphasizing the human aspects of the organizational functioning (e.g., Sambasivarao and Deshmukh, 1995; Boyer et al., 1997; Hewitt-Dundas, 2004).

Table 5. Hierarchical regression for PROFIT with independent Organizational functioning variables (N=320).

Step	Variables	b	R ²	ΔR ²	F
1			0,058		7,21**
	Technology	0,240**			
	Size	0,005			
2			0,097	0,039	8,30**
	Technology	0,069**			
	Size	0,000			
	Quality leadership	0,070**			
3			0,103	0,006	6,58**
	Technology	0,170*			
	Size	0,000			
	Quality leadership	0,186*			
	Training	0,009			
4			0,103	0,000	5,28**
	Technology	0,165*			
	Size	0,000			
	Quality leadership	0,178*			
	Training	0,008			
	Inter-functional design teams	0,0025			
5			0,104	0,001	4,41**
	Technology	0,171*			
	Size	0,000			
	Quality leadership	0,185*			
	Training	0,010			
	Inter-functional design teams	0,004			
	Group dynamics	-0,004			
6			0,108	0,004	3,88**
	Technology	0,187*			
	Size	0,000			
	Quality leadership	0,192*			
	Training	0,009			
	Inter-functional design teams	0,005			
	Group dynamics	-0,004			
	Soft integration	-0,006			
7			0,117	0,009	3,67**
	Technology	0,214**			
	Size	0,000			
	Quality leadership	0,202*			
	Training	0,113			
	Inter-functional design teams	0,002			
	Group dynamics	-0,02			
	Soft integration	-0,002			
	Worker empowerment	-0,191			

**p<.01

Quality leadership was the only significant variable in the equations, except for technology. When including all functioning variables the equation accounted for 11.7% of the variance in profitability compared to 5.8% for the control variables. The equation generated in step 3 in table 5 that includes the control variables, quality leadership and training explains 10.3% of the variance in profitability, which is significantly higher than the best equation with organizational design variables. Consequently, the functioning of the organization seems to affect the profitability. However, the relationships between the functioning variables and the profitability are weak.

In order to explore how the functioning of the firms affects effectiveness, the correlation coefficients between the structural and functional variables were calculated for the more and the less profitable firms, separately. We thus focus on the interaction effect of organizational structure and functioning. Companies with a profitability value between one and four, measured on a 7 point Likert scale from significantly lower to significantly higher than the competitors, were defined as less profitable, while those with a value between five and seven were defined as more profitable. For the more profitable firms significant and positive correlations are found between formalization and worker empowerment, quality leadership, training and group dynamics (table 4). Specialization is not significantly correlated to any functional variable. Decentralization is significantly and positively correlated to worker empowerment, training and group dynamics. Decentralization is significantly correlated with group dynamics with the highest coefficient ($r = .39$). For all firms the corresponding coefficient is .29 (table 6).

For the less profitable firms, formalization is only significantly correlated to soft integration ($p < .05$). Specialization is significantly ($p < .05$) and negatively correlated to worker empowerment and inter-functional teams. Decentralization is not significantly correlated to any functional variable. It is worth noting that no correlation coefficient is higher than .39 ($R = .15$). The interpretation of the correlation analysis is that the more profitable firms may in some way have managed to make the structural arrangements materialized into actions. They appear to have succeeded in realizing the intentions of the formal structure in the functioning of the firms. Thus, we conclude that the interaction of organization structure and functioning may have an impact on performance.

Table 6. Correlation among organization structure and functioning variables for high and low profit groups of firms.

Functioning Variables		Organization Structure Variables		
		Decentralization	Specialization	Formalization
Worker empowerment	High	0.25**	-0.02	0.21*
	Low	0.07	-0.23*	0.05
Soft integration	High	0.23**	0.08	0.18 [†]
	Low	0.11	-0.19 [†]	0.24*
Training	High	0.32**	0.00	0.26**
	Low	0.01	0.05	0.20 [†]
Group dynamics	High	0.39**	-0.03	0.21*
	Low	0.14	-0.12	0.21 [†]
Quality leadership	High	0.16 [†]	0.03	0.26*
	Low	0.03	0.01	0.13
Inter-functional design teams	High	0.17 [†]	-0.05	0.19*
	Low	0.09	-0.27*	0.16

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High = High profit group (N = 113)

Low = Low profit group (N = 83)

† p<.10

*p<.05

**p<.01

In order to investigate any causal linear relationship of the interaction of organization structure and functioning on profitability, linear regression analysis was conducted. The analysis was designed and performed in the same way as for the previous regression analysis, i.e. with size and technology as control variables and stepwise inclusion of the independent variables. Five new independent variables measuring the interaction between organizational design and functioning were formed – 'Decentralization x Training,' 'Decentralization x Inter functional design teams,' 'Decentralization x Group dynamics,' 'Decentralization x Soft integration,' and 'Decentralization x Worker empowerment.' The only measures formed were the structural variable decentralization and the functioning variables with the strongest correlation with decentralization. Table 7 shows the generated regression models.

Table 7. Hierarchical regression for PROFIT with Organizational structure and functioning variables (N=320).

Step	Variables	b	R ²	ΔR ²	F
1			0,058		7,21**
	Technology	0,240**			
	Size	0,005			
2			0,067	0,009	5,95**
	Technology	0,201**			
	Size	0,000			
	Dec x Train	0,003			
3			0,069	0,002	4,16**
	Technology	0,193*			
	Size	0,000			
	Dec x Train	0,003			
	Dec x Teams	0,000			
4			0,069	0,000	3,40**
	Technology	0,196**			
	Size	0,000			
	Dec x Train	0,003			
	Dec x Teams	0,001			
	Dec x Group	0,000			
5			0,079	0,010	3,23**
	Technology	0,212**			
	Size	0,000			
	Dec x Train	0,004			
	Dec x Teams	0,001			
	Dec x Group	0,000			
	Dec x Soft	0,000			
6			0,103	0,024	3,66**
	Technology	0,214**			
	Size	0,000			
	Dec x Train	0,006*			
	Dec x Teams	0,001			
	Dec x Group	0,000			
	Dec x Soft	0,000			
	Dec x Wemp	-0,007			

**p<.01

None of the independent variables (except for the control variable technology) is significant, and the best regression model explains 10.3% of the variance of the profitability variable, which is lower than for the best model with only functioning variables (quality leadership and training). Consequently, the conclusion is that the functioning of the organization has some minor impact on organizational effectiveness. The analysis could, however, not reveal any significant impact of the interaction between decentralization and organizational functioning on performance.

It has long been recognized that this intention of decentralization is not always fulfilled in practice (Hales, 1999). It appears to be little support for the decentralization thesis according to Hales (ibid.). Literature examining the

relationship of decentralization to organizational performance is both scarce and equivocal (Richardson et al., 2002). Evidence of positive influences on objective indices like financial performance has been hard to obtain (Wagner, 1994; Wagner, Leana, Locke and Schweiger, 1997). The main effect of decentralization reported by Richardson et al. (2002) was not significantly associated with performance. The relationship of decentralization to financial performance appears to be much more complex than has been traditionally conceived (ibid.).

5.3 Testing hypothesis Three

The third hypothesis is that structure impacts effectiveness (profitability). There is, however, no significant correlation between any of the three structural variables decentralization, specialization and formalization and the effectiveness variable profitability (table 4). Linear regression analysis was used to further test the relationship between the organization structure variables and profitability. The analysis was designed and performed in the same way as for the previous regression analyses, i.e. with size and technology as control variables and stepwise inclusion of the independent variables (table 8).

Table 8. Hierarchical regression for PROFIT with independent Organizational structure variables (N=320).

Step	Variables	b	R ²	ΔR ²	F
1			0,058		7,21**
	Technology	0,240**			
	Size	0,005			
2			0,059	0,001	4,90**
	Technology	0,261**			
	Size	0,000			
	Decentralization	-0,006			
3			0,065	0,007	4,54**
	Technology	0,308**			
	Size	0,000			
	Decentralization	-0,102			
	Formalization	-0,008			
4			0,062	-0,003	2,68*
	Technology	0,268**			
	Size	0,000			
	Decentralization	-0,008			
	Formalization	-0,008			
	Specialization	0,000			

*p<.05
**p<.01

The control variable technology has a significant impact on profitability. Size does not account for any amount of the variance in profitability. The organization structure variables, which are entered into the model in the second to fourth steps account for an incremental R² of .007 (when decentralization and formalization are entered into the model, but not specialization). None of the variables are significant. Consequently, this analysis shows that the degree of specialization, formalization

and/or decentralization does not explain why some firms are more profitable than others.

6. Discussion

Behavior in organizations is not easy to understand, guide or predict. In order to make humans act in specific ways at work requires their competence, effort, motivation and commitment. It also requires a work climate, co-operation, group norms and an organizational culture, which supports the overriding ambition of belonging to an effective and successful organization. The organization structure is only one of many parameters for making organizations better for all those that are affected by the way in which the organization functions and performs.

The structural variable "decentralization" appears to affect how organizations function in respect to "group dynamics" as well as "training." The reason for this is probably that decision-making at lower levels in the organization facilitates group work and initiative as well as ensuring that training is tailor-made to the needs of production. The functional variables of training, quality leadership, inter-functional design teams and group dynamics were significantly correlated with "profit" irrespective of the level of investment in advanced technology. When the level of technology investment is taken into account, quality leadership had highest and training the second highest significant impact on "profit." Factory level training and leadership appear to enhance effectiveness due to strong linkage to production processes and utilization of production equipment. The more profitable firms appear to have infused the intentions of the formal structure into the functioning of the firms. It is apparent that the structural variable "decentralization" for the more profitable firms has affected a number of functioning variables to a greater degree than it has for the less profitable ones.

This empirical investigation of 320 manufacturing companies in one particular industry in Sweden does not warrant the drawing of general conclusions. The number of functional variables can be increased tremendously and their definitions altered. If incentives and the reward system are regarded as properties of the organizational design, as Burton and Obel (1998) and Hales (1999) argue, then we assume that the relationship between organization structure and function will be stronger. Formalization concerns what people are supposed to do, not what they are expected to achieve.

7. Conclusions

The quest for new organization structures aims at making organizations more effective. Organizations are purposely designed and re-designed because some structures are considered "better" than others.

The structure of the organization affects the way the organization functions. This hypothesis is tested. Empirical data suggests that structure only marginally affects the way in which organizations function. The structural variable "decentralization" has some impact on the functional variables defined and measured as "group dynamics" and "training." The decentralization variable of the more profitable firms has affected functioning variables to a greater degree than it has for the less profitable ones.

The second hypothesis tested implies that the functioning of the organization causes effectiveness. The test shows that the functioning of the organization has a minor impact on profitability. It is the functional variables "training" and "quality leadership" that have some impact on organizational effectiveness.

Theoretical arguments as to why organization structure affects performance are presented. When tested on data from 320 companies the hypothesis failed to command the expected support. There is no significant relationship between organization structure and effectiveness. If the misfit contingency model of Burton and Obel (1998) is valid, and if a low portion of companies are profitable this may explain why our study failed to find a relationship between structure and profitability. This study confirms most other studies in indicating weak and or insignificant relationships between structure, functioning and effectiveness. Additionally, we suggest theoretical reasons for these empirical results.

The theoretical implications of this study are that it is important to acknowledge that organization structure alone does not determine the functioning of the organizations. The formal and informal structure is only one of many factors that determine how organizations actually function. The functioning of the organization does have an impact on organizational effectiveness. Many other factors have stronger impact. Internal factors like investment in advanced technology – at least in the manufacturing industries – affect company profitability. External factors like market conditions are likely to have a large impact too. By acknowledging that form does not determine function, theorists and managers can look for and properly assess new organization structure alternatives before implementing them.

The managerial implications are that the functioning of an organization is only partly due to the organization structure chosen. Many measures need to be taken by management in order to make the organization function in a particular way. Suggestions or arguments in favor of changing the organization structure cannot be assessed without due consideration of the functioning of the organization that is assumed to be the consequence of the new design. It is how the organization functions that may affect the degree of goal attainment and success, not the structure.

The issue has been how to perceive the structure-effectiveness relationship. Some scholars suggest that the relationship be from the independent variable structure to the dependent variable effectiveness with some moderating or intermediate variables like internal and external contexts. Richardson et al. (2002, p. 237) advocate a model of the moderator kind when they say, "The relationship of decentralization with performance was moderated by other factors which indicate that the relationship between decentralization and performance is not the same in all situations." We found support for the moderator model.

We propose function as a mediating factor relating structure to effectiveness based on theoretical arguments and empirical evidence. The consequence of this conceptualization is that we are not tempted to expect a strong or direct causal relationship between organization structure and specific outcomes in terms of effectiveness. There is but a weak relationship between structure, function and effectiveness. This insight may enable managers to assess and properly select new organization structures. To improve the effectiveness of organizations, reorganizing is probably not the first option to consider. More empirical studies are, however, necessary to further exploit the relationship between organization structure, functioning and effectiveness.

APPENDIX

Measures and questionnaire

A. Organizational Structure

(1) DECENTRALIZATION (DEC):

Which is the lowest level in your company that has the authority to make the following decisions?

(1. GM = General Manager or above; 2. PM = Plant or Divisional Manager; 3. DM = Departmental Manager; 4. SUP = First-level Supervisor; 5. SHOP = Shop level)?

a) Number of workers required; b) Whether or not to employ a worker; c) Resolution of internal labor disputes; d) Amount of overtime to be worked at shop level; e) Delivery dates and priority of orders; f) Production plans to be worked on; g) Dismissal of a worker; h) Methods of personnel selection; i) Method of work to be used; j) Machinery or equipment to be used; k) Allocation of work among available workers.

(2) FORMALIZATION

(Scale calculated as the total score of items a-d divided by 17/7.)

(a) Information booklets treating, for example, security, working conditions, etc. are given to: (Check one)

a) No one; b) Only a few employees; c) Many employees; d) All employees; e) Don't know.

b. An organization chart is given to: (Check one)

a) Plant manager only; b) Plant manager and direct reports; c) All supervisory personnel; d) Entire plant; e) Don't know.

c. Written job descriptions exist for: (Check as many as apply).

a) Direct production workers; b) Clerical workers; c) Supervisors; d) Specialists; e) Plant manager.

d. Documentation exists for: (Check as many as apply)

a) Mission statement; b) Manual of procedures; c) Operating instructions to workers; d) Production schedule.

3) JOB SPECIALIZATION

Estimate the total number of positions used in your plant/factory (include both management positions as well as production personnel, e.g. production manager, first-level supervisor, direct production personnel)

B. Functioning

1) SOFT INTEGRATION (SOFTINT):

Rate the extent of usage of the following linkage mechanisms in co-ordinating efforts between different functional areas such as engineering, manufacturing, marketing, etc. (7 point Likert scale from "no emphasis" to "extreme emphasis").

a) Direct contact; b) Physical proximity; c) Electronic mail; d) Liaisons; e) Secondment; f) Cross-functional project teams; g) Permanent project teams; h) Matrix organization.

2) WORKER EMPOWERMENT (WEMP):

Indicate the degree of emphasis, which your manufacturing plant places on the following activities (7 point Likert scale from "no emphasis" to "extreme emphasis").

a) Giving workers a broader range of tasks; b) Giving workers more planning responsibility; c) Giving workers more inspection/quality responsibility; d) Changing labor/management relationships; e) Improving direct labor motivation; f) Improving direct labor training.

3) TRAINING (TRAIN):

Please answer the following questions regarding employee skills and training in your manufacturing plant (7 point Likert scale from "strongly disagree" to "strongly agree").

a) Direct labor undergoes training to perform multiple tasks in the production process; b) Employees are rewarded for learning new skills; c) Our plant has a high skill level, compared with our industry; d) Direct labor technical competence is high in this plant.

4) GROUP DYNAMICS (GROUP):

Please answer the following questions regarding production teams in your manufacturing plant (7 point Likert scale from "strongly disagree" to "strongly agree").

a) Our plant forms teams to solve problems; b) In the past three years, many problems have been solved through team efforts; c) During problem solving sessions, all team members' opinions and ideas are considered before making a decision.

5) QUALITY LEADERSHIP (QLEAD)

Please indicate your level of agreement or disagreement with the following statements (7 point Likert scale from "strongly disagree" to "strongly agree").

a) All major department heads within our plant accept responsibility for quality; b) Plant management provides personal leadership for quality improvement; c) The top priority in evaluating plant management is quality performance; d) All major department heads within our plant work to encourage just-in-time production; e) Our top management strongly encourages employee involvement in the production process.

6) INTER-FUNCTIONAL DESIGN TEAMS (INTERFUN):

Please indicate your level of agreement or disagreement with the following statements (7 point Likert scale from "strongly disagree" to "strongly agree").

a) Direct labor employees are involved to a large extent (in teams or consulted) before introducing new products or making product changes; b) Manufacturing engineers are involved to a great extent before the introduction of new products; c) There is a great deal of involvement of manufacturing and quality personnel in the early design of products before they reach the plant; d) We work in teams, with members from a variety of areas (marketing, manufacturing, etc.) to introduce new products.

C. Effectiveness

1) GROWTH & PROFIT:

For your major product line, indicate your position with respect to your competitors on the following dimensions for the last two years (7 point Likert scale from "significantly lower" to "significantly higher." GROWTH: a; b; PROFIT: c; d; e).

a) Market share growth; b) Sales growth; c) Return on investment (ROI); d) Growth in ROI; e) Return on sales (ROS).

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