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THE "VERTICAL" SUBSYSTEMS OF THE "ISOLATED" FARM FIRM: I

by H. Seuster
Justus-Liebig University, Giessen
and L.K. Oosthuizen*
University of the Orange Free State, Bloemfontein

1. INTRODUCTION

Organization theory is the study of the structure and functioning of organizations and the behavior of groups and individuals within them (Pugh, 1966). The systems approach to organization theory has not been studied sufficiently from a farm management viewpoint (Dillon, 1979).

However, Seuster (1966 & 1975) has conceptualized the farm firm as a system, but as often happens with management research in French and German speaking countries, it is not adequately integrated into the Anglo-American literature. As point of departure for the conceptualization of the farm firm, the "isolated" farm firm is modelled in a multi-stage manner. This modelling process attempts to develop a better understanding of the structure, functioning and evolution of the "integrated" farm firm. The procedure applied in the modelling process was at first exclusively "vertically" oriented in imitation of the temporal sequence of the production process. Later two basic "horizontal" subsystems (grain and swine enterprises) were conceptualized. The models developed in these studies are fundamental and have not been published in English. They have been modified and extended for presentation here.

The focus in this paper is on the first stage i.e., the conceptualization of the "vertical" subsystems of the "isolated" farm firm. The purpose is to answer the question whether and how general systems theory can be used to explain the structure and functioning of the "isolated" farm firm?

2. PROCEDURE

Systems analysis and synthesis are the tools that systems science provides to explain the structure and functioning of the farm firm.

Systems analysis includes the analyses of the objectives, elements, relationships and behavior of the system. The procedure in this paper focuses on the analyses of the elements and relationships of the farm firm. The first step (analysis of objectives) is limited to the general goal which is assumed to be the realization of income by manipulating resources and situations. Therefore, an organization system should be created by which economic objectives can be achieved optimally. The last step (analysis of behavior) centers on the equilibrium problem viewed from an efficiency viewpoint. It is simplified here to an "isolated" organization system which largely corresponds to a self-contained firm.

The following classification of systems is employed: system, subsystem, intermediate system, base system and element (Bleicher, 1971). This "hierarchy of systems" only applies for the purpose of this study. Other objectives permit and condition different classification schemes.

Elements are the smallest parts of a system being analyzed. In turn elements may be systems. However, they are regarded as elements when their internal structure is no longer the object of the study but only important because of the effects of their functioning on the system under study (Bleicher, 1970). The delimitation of elements and systems thus depends on the perspective of the study, the objectives of the study as well as the thing that must be examined. Elements are connected by relationships into the smallest organization units which are able to perform namely base systems (Bleicher, 1971). Thus the organization system of the firm is accomplished as a result of successive syntheses of organization elements to base systems (base system formation), base systems to intermediate systems (intermediate system formation), intermediate systems to intermediate systems of a higher order (subsystem formation) and subsystems into the whole system of the firm (whole system formation).

The basic problem with organizational system synthesis is to delineate system boundaries in such a way that a division of labor in the firm is possible while endangering the integrated whole as little as possible (Grochla, 1974). Two fundamental guidelines are formulated to deal with this problem. First, the number of possible relationships among the elements of the system should substantially exceed the number of relationships between these elements and other elements lying outside the system. Secondly, system formation should enable each subsystem within the whole system to reach a flow equilibrium and to stabilize as an open system in the exchange of matter, energy and information with the environment.

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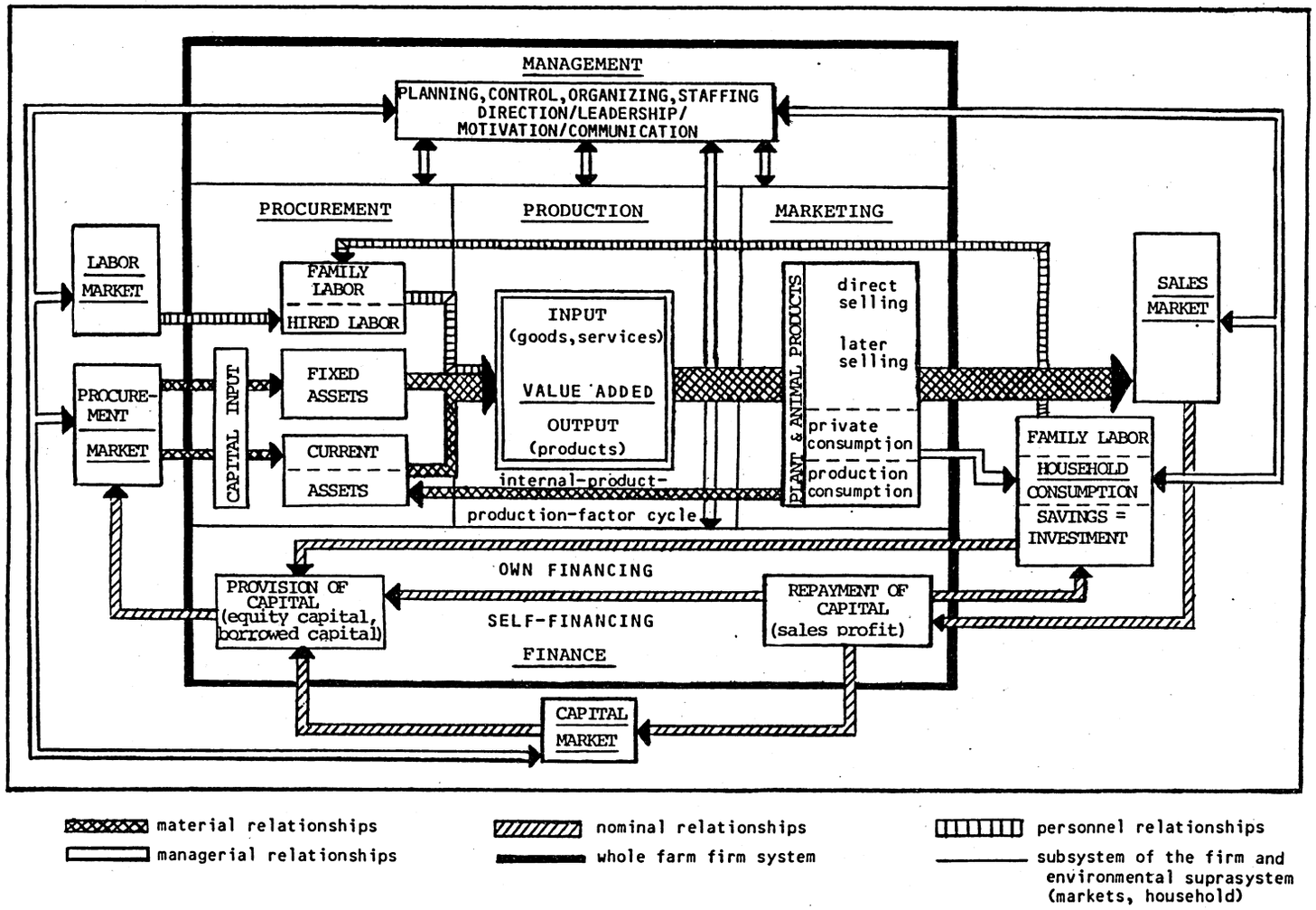

DIAGRAM 1 - The organization system of the "isolated farm firm"

Because energy, matter and information as types of relationships are too general in nature to describe the relationships of the farm firm, the classification scheme of Bleicher (1971) is used. This scheme differentiates among the following types of exchange of relationships: (1) material relationships (goods); (2) nominal relationships (money, capital); (3) personnel relationships (services); and (4) managerial relationships (information).

Every farm firm is unique because of its spatial and temporal location, its history, resources and individuals. As there can be as many theoretical models as there are firms in practice, a complete portrayal is automatically excluded. In view of the purpose of this paper, absolute completeness is neither necessary nor desirable.

3. THE "VERTICAL" SUBSYSTEMS OF THE "ISOLATED" FARM FIRM AND THEIR INTERACTION

The "isolated" farm firm is an economic organization which has an entirely independent position within the market system. By definition it is not supported by any auxiliary services which are organizationally connected, or by other self-contained units which can be referred to as auxiliary systems in this context. It is a management system which is relatively complete in itself, largely corresponding to the ideal of a "self-contained firm" in the market system. The organization system of the isolated farm firm is illustrated in Diagram I.

The classification of the organization system is exclusively "vertically" oriented, i.e. with regard to the temporal or final sequence of the production process. Thus a "horizontal" classification, i.e. in respect to farm enterprises is missing. It is generally accepted that the traditional economic activities of the farm firm are usually composed of various sectional processes which are either completed simultaneously or successively. From the problem statement it is clear that the focus in this paper is only on the vertical subsystems of the firm.

As illustrated in Diagram I, the organization system is differentiated into five subsystems: procurement, production, marketing, finance and management. The mutual relationships among the five subsystems and among the various intermediate systems, base systems and/or elements of the firm as well as among the different surrounding systems in the environmental suprasystem are illustrated in Diagram I. The above mentioned relationships follow clearly from the diagram making further explanation unnecessary. However, the consistent bilateral relationships of the management subsystem with the other subsystems of the firm (procurement, production, marketing and finance) as well as with the surrounding systems (labour market, procurement market, capital market, sales market and household) in the form of action and reaction should be pointed out. In addition, the finance subsystem is bilaterally related to the capital market and household systems, because it receives capital from both these systems and in turn passes capital to them.

With this, it is demonstrated how the structure and functioning of the whole system, according to the guidelines laid down in the procedure, can be roughly conceptualized. Subsequently each subsystem is analyzed more closely.

3.1 The procurement subsystem

The procurement subsystem consists of the following intermediate systems: (1) procurement of labour (family and hired labour); (2) procurement of fixed assets (land, improvements, buildings, machinery, breeding livestock); and (3) procurement of current assets (market livestock, feed, seed, fertilizer, energy). Depending on the purpose of the study, the above mentioned intermediate systems in turn can be further subdivided. Then they take on the character of base systems and/or elements. The items listed in parentheses already indicate classification possibilities. A classification scheme is illustrated in Diagram 2.

Thus far the focus was on the structure of the procurement subsystem. If, however, the analysis focuses on the relationships among the components of the system as well as on the relationships between other subsystems of the firm and other surrounding systems in the environmental suprasystem, then insights into the processes which are taking place within this subsystem is possible.

It does not seem necessary to interpret the relationships in Diagram 2 because the illustration indicates it clearly enough. In general, however, the following can be said: on the one hand the procurement subsystem has relationships with other surrounding systems namely systems that are related to the procurement market and on the other hand it also has strong relationships with the other subsystems of the firm namely management and production as well as with the intermediate systems of family labour and home grown commodities. In addition to this there is also an indirect relationship with the finance subsystem. In general the procurement subsystem is thus an open system.

Though this analysis does not focus on factual details, it is important to point out some peculiarities of the agricultural procurement process in comparison with other industrial organizations. These peculiarities are comprised of the specific significance of the intermediate systems of family labour as well as home grown commodities. Finally it should be mentioned that the procurement processes join hands with the production subsystem in logical sequence.

3.2 The production subsystem

In Diagram I it is indicated that the

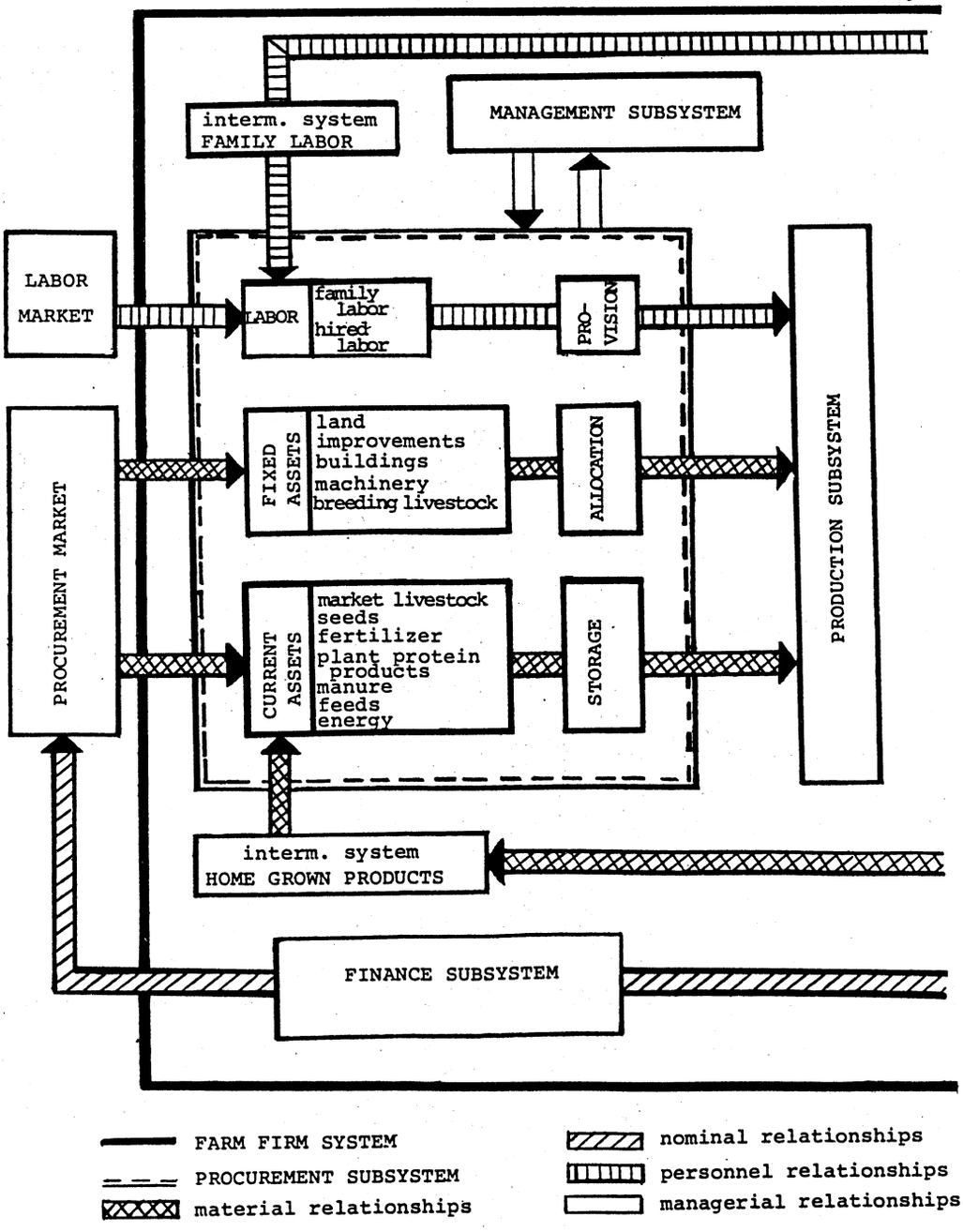

DIAGRAM 2 - The relationships of the procurement subsystem

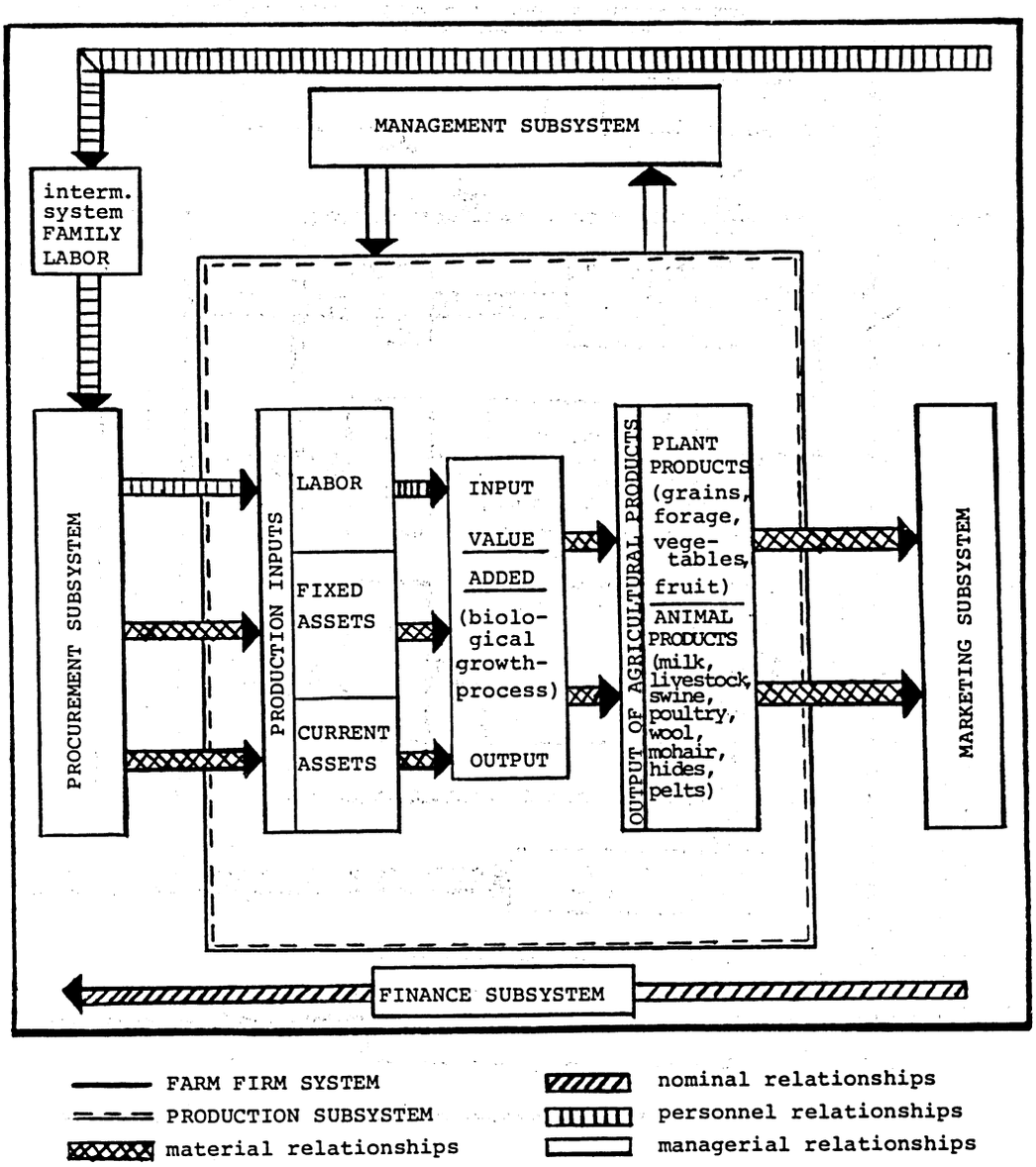

DIAGRAM 3 - The relationships of the production subsystem

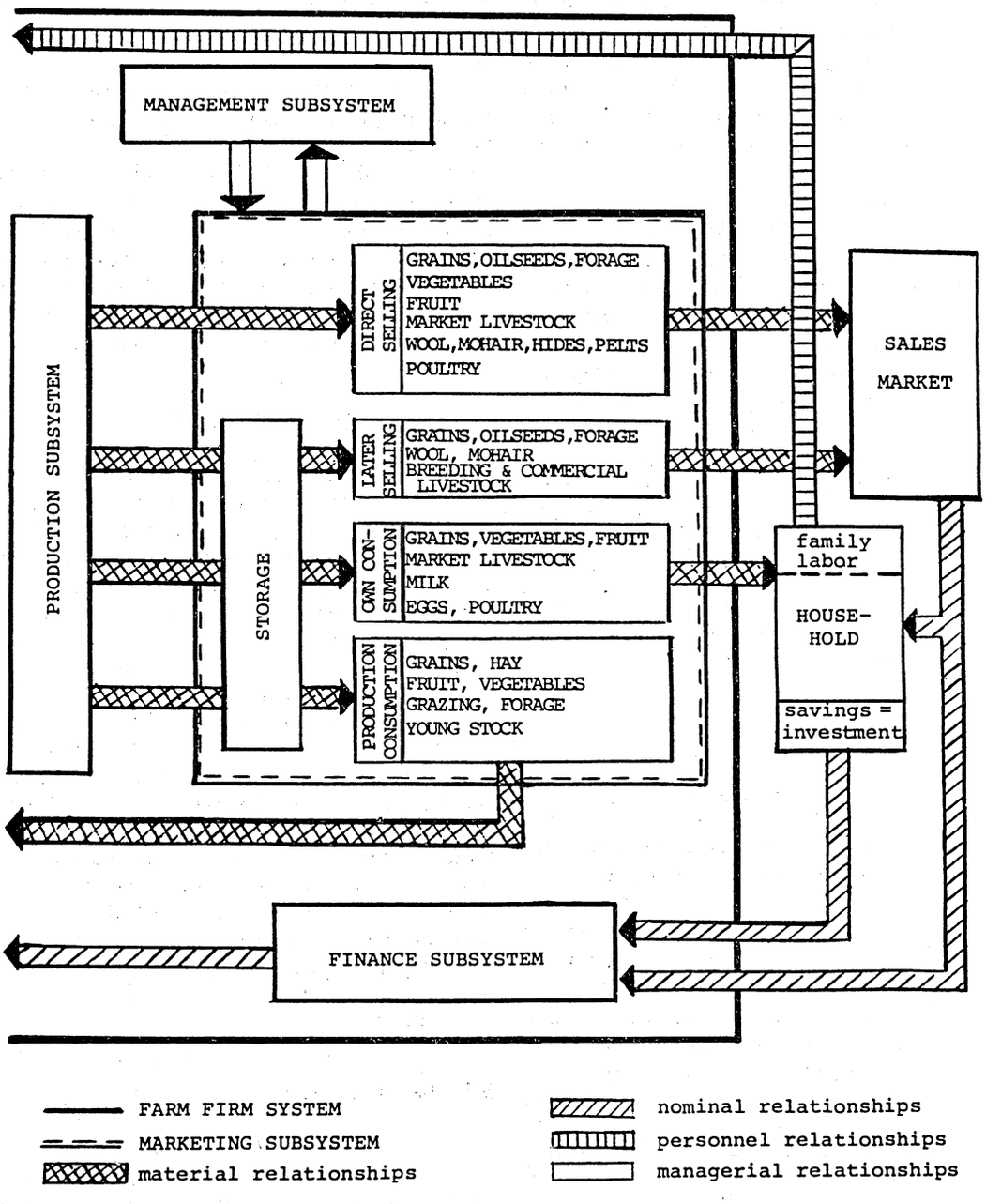

DIAGRAM 4 - The relationships of the marketing subsystem

production subsystem simply consists of two successive sections: inputs and outputs. The inputs consist of nominal goods (money) as well as real goods in both material form (fixed and current assets) and immaterial form (human and animal performance, energy and information). The outputs consist of plant and/or animal products. For a formal analysis of the components of the production subsystem, again Bleicher's (1971) scheme of intermediate systems, base systems and elements can be employed. This is illustrated in Diagram 3. It becomes evident that the input component links with the procurement subsystem, while the output component links with the marketing subsystem.

Instead of undertaking a structural analysis of the production subsystem, the emphasis here is on the processes because the functioning is of primary importance. The production processes comprise basically the transformation of inputs to outputs in order to create value for the firm.

The relationships of the production subsystem are clearly illustrated in Diagram 3 and require no further description. In general, however, it can be mentioned that the production subsystem is an open system. Additionally, the entire technical production process in the farm firm is especially characterized by the fact that production occurs by means of growth processes in plants and animals while the human factor tries to create an optimal climate for production; thus no direct human creation of products.

3.3 The marketing subsystem

In temporal and teleological sequence the production process within the firm is completed with the marketing of products (outputs). With regard to the type of product (structure) the marketing subsystem is divided into two sections namely the marketing of plant and animal products. If, however, the marketing activities (function) are viewed, then a classification into four intermediate systems: direct selling, later selling, private consumption by the family and farm household (all participants in the firm) and production consumption for farming purposes can be used. Seuster (1966) explains these concepts in detail. The relationships of the marketing subsystems are illustrated in Diagram 4.

The structural classification of the marketing subsystem corresponds with the output component of the production subsystem and requires no further explanation. From a functional viewpoint, however, there exist four marketing routes (intermediate systems) for agricultural products. The routes of private consumption and production consumption are typical for the farm firm. Furthermore, one must distinguish between direct selling which represents an alternative to later selling (e.g. grain crops) and direct selling of perishable products (e.g. milk, fruit, vegetable, eggs) where there is less flexibility as far as market strategy is concerned.

Like the other subsystems of the farm firm the marketing subsystem is an open system. The marketing subsystem has relationships with other subsystems of the firm as well as with the household and other systems which are connected with the sales market. These general relationships of the marketing system with the environmental suprasystem have been carefully studied by Alewell (1971).

In summary it can be said that the entire technical process (procurement, production and marketing) in the farm firm is particularly characterized by the following items: (1) production factors (e.g. seed) are in part provided by the firm itself; (2) no direct creation of products; (3) selling of products to the farm household; and (4) selling of products (e.g. home grown feed) to the farm firm for production purposes. Logically there is an imperative connection between (1) and (4).

3.4 The management subsystem

The procurement, production and marketing subsystems, which constitute the technical aspects of the production process in the farm firm, are planned, controlled, organized, staffed, motivated and directed by the fourth subsystem of the firm namely management. Whereas the first three subsystems exist side by side or are completed successively with respect to time and factual requirements, the management function is included throughout. The management subsystem creates the whole firm in a particular way. Management or the so-called fourth production factor is included in all actions and processes of the farm firm. Gutenberg (1960) describes the other three production factors (land, capital and labour) as dependent and non-self-contained and the fourth factor as dominant. Within the scope of this paper it is impossible to explain the processes and relationships of the management subsystem in full detail. Oosthuizen (1981, pp. 81-94) provides a complete analysis.

3.5 The finance subsystem

Finance is the last subsystem of the farm firm illustrated in Diagram I. Just like management this field more or less penetrates the technical fields, especially procurement and marketing.

The definition of the term finance (Seuster, 1981) suggests dividing the finance subsystem into three intermediate systems: provision of capital, capital input (investment) and repayment of capital (disinvestment). By again applying Bleicher's (1971) classification scheme of intermediate systems, base systems and elements, a better understanding of the structure of the finance subsystem can be obtained.

The relationships of the finance subsystem with the other subsystems as well as with the relevant surrounding systems are illustrated in

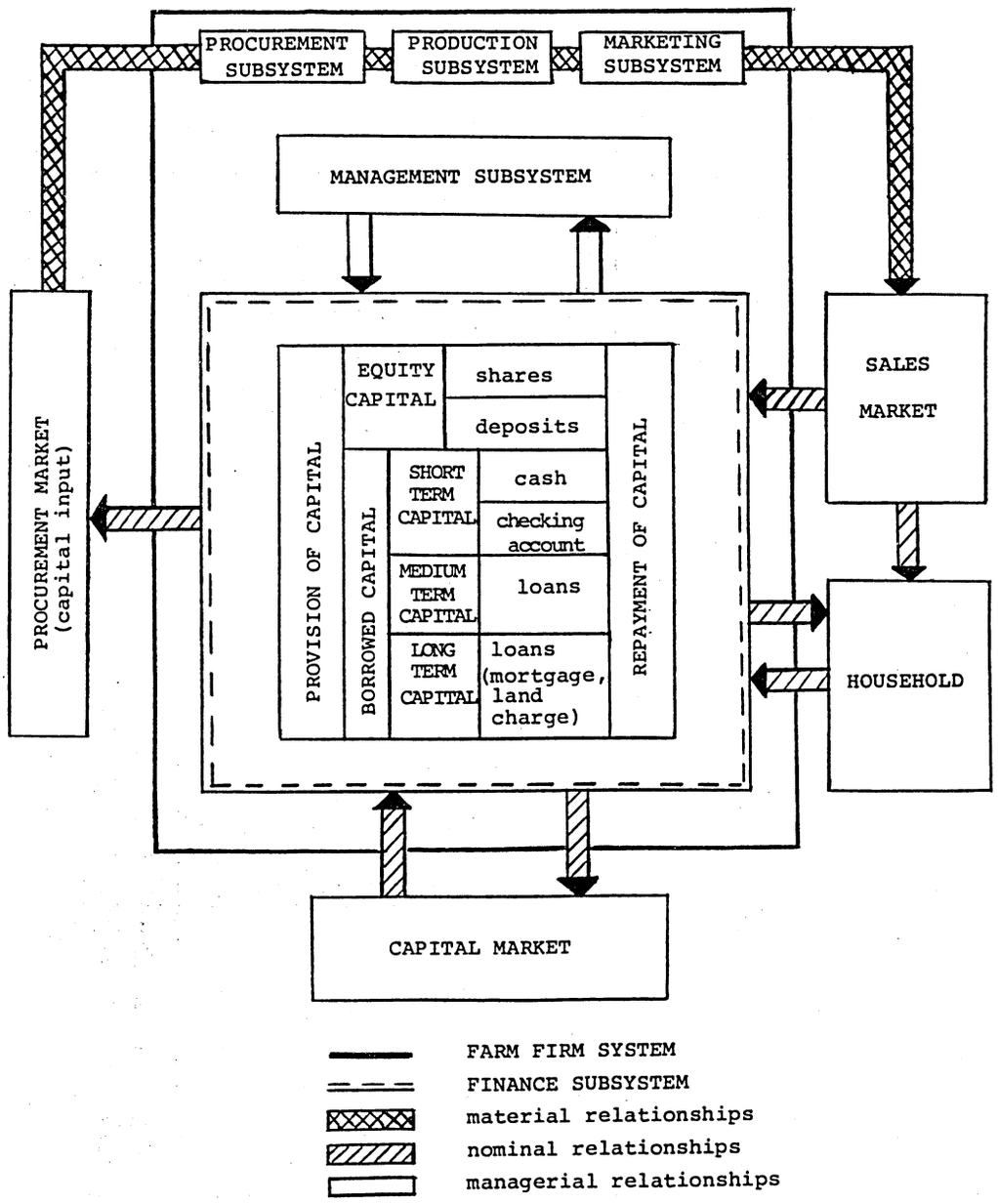

DIAGRAM 5 - The ralationships of the finance subsystem

Diagram 5. The focus in this study is on defining the subsystems comprising the whole farm firm and the relationships in Diagram 5 will not be analyzed further at this time. This analysis will be considered when finance is viewed as a self-contained system. The finance subsystem, like the other subsystems, has direct relationships with other systems and subsystems. Therefore it has to be pointed out that in practice there are indirect relationships to the subsystems of procurement, production and marketing which for simplicity are only alluded to in Diagram 5.

Within the finance subsystem there are base systems and elements respectively which characterize the initial and final state of the financing process (Diagram I). It is difficult, within the framework of the isolated firm, to illustrate the intermediate stages which capital runs through during the time it is put into action, for as long as they assume the status of being assets they are tied to the technical production process. In this respect it is generally true that the flow of financial means moves in the opposite direction from the flow of goods and services.

Diagram 5 indicates that the finance subsystem is directly connected with only one other subsystem namely management. The fact that there is only one direct link should not be interpreted to mean that the finance subsystem is isolated. Its interdependence with the technical subsystems by means of indirect relationships has already been mentioned. Thus, there is a large number of indirect relationships between the finance subsystems and other subsystems of the firm. In addition there are relationships with four surrounding systems (procurement market, sales market, capital market, and household) reinforcing the interdependence between the finance subsystem, on the one hand, and the rest of the system and the environment on the other. Thus the finance subsystem is an open system.

4. SUMMARY, CONCLUSIONS AND RECOMMENDATION

On the question whether it is possible to explain the structure and functioning of the farm firm by means of general systems theory, the reply must be decidedly in the affirmative. Subsequently it is demonstrated how the systems of the farm firm can be conceptualized. The farm firm system consists of five subsystems; procurement, production, marketing, finance and management. Guidelines are provided for the delimitation of the systems of the farm firm and it is also indicated how the systems interact with each other. A study of the relationships among the subsystems and between the subsystems and the environmental suprasystem, as illustrated in the diagrams, provides valuable insights into the structure and functioning of the farm firm system.

The conceptualization of the "isolated" farm firm is valuable because it is to a great extent typical of the agricultural industry with a less developed infrastructure. It is clear, however, that all the subsystems (procurement, production, marketing, finance and management) and herewith the whole system of the isolated farm firm contains fundamental structural weaknesses which reduce its growth possibilities. For a better understanding of the structure and functioning of the farm firm system, the systems approach to organization theory is recommended because of its greater precision, universality, versatility and simplicity.

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