Inventorying Resources: An Application to Product-oriented Agriculture

by

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Abstract:

Different resources are necessary in the new, product-oriented agricultural environment. This article explores the question of what information is best suited for strategic analysis and strategy formulation for firms involved in product-oriented agriculture. A new framework for inventorying agricultural resources is introduced, and suggestions for implementing it are included.

1. Introduction

The long term trend in agriculture of moving from the production of general commodities to the production of products with special characteristics has been cited frequently in the agricultural economics literature (Handy and Padberg, Bonnen and Schweikhardt, Senauer et al., and Boehlje). To clarify, agricultural commodities are standardized goods produced on farms. They have established grades and standards that specify broad ranges for important nutritional or other characteristics. Profitability for commodity producers hinges on producing large volumes of goods that are sold often at thin margins. Differentiated agricultural products, on the other hand, have tighter specifications for key quality characteristics. They are more likely to have tighter vertical coordinating mechanisms, such as contractual agreements, rather than traditional open markets (Connor and Barkema). In short, differentiated agricultural products are products with special features (other than lowest price) that are desired by a targeted group of customers.

Quite apart from this trend toward differentiated agricultural products, agricultural economists and government analysts have produced assessments, or inventories, of resources related to agricultural production for many years. This article shows that traditional inventories of agricultural resources have been (not surprisingly) commodity-oriented, and that the information presented in these inventories is not well suited for decision making in a product-oriented environment. A new type of analysis would be preferred in providing the dynamic information that will effectively support the strategic management efforts of agricultural producers and other participants in increasingly product-oriented markets. This article will draw upon theoretical literature from general management and an empirical study of agricultural producers to develop a new method of inventorying agricultural resources for product-oriented

agriculture. In particular, the article addresses two research questions:

1. Is there a resource inventory that would be particularly relevant to product-oriented agricultural producers? If so, what is it?

2. How does this inventory differ from historic agricultural resource inventories?

In order to fully address these questions, it is necessary to examine theoretical and empirical work that is related to strategic analysis and strategy formulation for agribusiness firms, especially those that produce differentiated agricultural products. Specifically, two theoretical concepts, the Resource-Based View of the Firm (RBV) and Porter's diamond model of national competitive advantage, are reviewed in the second section. An empirical study of producers involved in product-oriented agriculture is also reviewed. In the third section, three examples of past inventories of agricultural resources are examined. The limitations of these approaches to inventorying resources for product-oriented strategy formulation are highlighted based on the theoretical and empirical findings laid out in the second section. In the fourth section, a new method of inventorying resources for product-oriented agriculture is introduced. In the fifth section, detailed suggestions regarding the application of the resource inventory framework will be presented. The sixth section lays out implications of this research for agribusiness decision makers. The seventh and final section includes a summary and conclusions.

2. Theoretical and Empirical Foundations

Three sources were found relevant to defining a resource inventory for product-oriented agriculture. Two of these sources are theories (the Resource-Based View of the Firm and Porter's diamond model of national competitive advantage), and the third is an empirical study of product-oriented agricultural producers.

The Resource-Based View of the Firm (RBV) is a theory that assesses the potential for resources to provide firms with a sustained competitive advantage. The RBV argues, in part, that the production and marketing of special product features requires rare, or perhaps even unique, resources (Barney, 1997). Given that product-oriented agriculture involves products with special features, the RBV is particularly applicable to the task at hand.

According to the RBV, firm managers seek to attain a sustained competitive advantage for their firms. The RBV holds that in order for a resource to provide a sustained competitive advantage, it must have four characteristics. The first necessary attribute is that they must be *valuable*, i.e., they exploit opportunities or neutralize threats in the firm's environment. The second attribute necessary for resources to provide a sustained competitive advantage is that they be *rare* among the firm's present and potential competitors. No common resource can enable a firm to conceive of and implement a strategy that could not also be conceived of and implemented by many other firms. If other firms can duplicate the strategy of a particular firm with common resources, the firm cannot achieve a competitive advantage. If other firms cannot obtain a resource that is valuable and rare, it is said to be *imperfectly imitable*. This is the third necessary attribute for resources to provide a sustained competitive advantage. Barney (1991) gives several potential reasons why a resource may be imperfectly imitable. These reasons include special historical circumstances and path dependency, resources that arise from socially complex processes, and causal ambiguity related to the link between the competitive advantage and the resource. The fourth requirement for a resource to provide a sustained competitive advantage is that it must not be *substitutable* (Barney, 1991). In other words, there must not be any strategically equivalent resources that can be deployed that are valuable, but are either not rare or

not imperfectly imitable. If a valuable, rare, and imperfectly imitable resource has no strategically equivalent resources, then it can provide a sustained competitive advantage. In a product-oriented world, any effective resource inventory would need to catalog the truly valuable resources that meet these four attributes.

In addition to the RBV, Porter's diamond model of national competitive advantage is particularly relevant to the evaluation of resources. This emphasis on the influence of certain location-specific aspects of firms' environments makes Porter's work relevant to this research because geographic specialization often occurs in the production of differentiated agricultural products (Davis). In Porter's diamond model, there are four broad attributes that promote (or impede) the achievement of competitive advantage of particular industries. The determinants are defined as follows.

> "1. *Factor conditions*. The nations's position in factors of production, such as skilled labor or infrastructure, necessary to compete in a given industry.
> 2. *Demand conditions*. The nature of home demand for the industry's product or service.
> 3. *Related and supporting industries*. The presence or absence in the nation of supplier industries and related industries that are internationally competitive.
> 4. *Firm strategy, structure, and rivalry*. The conditions in the nation governing how companies are created, organized, and managed, and the nature of domestic rivalry" (p. 71).

These determinants act as a dynamic, interdependent system to allow particular national industries to achieve a global competitive position. Many examples of how the determinants interact to evolve the diamond are given. One example is that demanding and sophisticated buyers induce upgrades in product features and technology. Another example is that world class suppliers enable firms to make improvements in their products and processes. In addition to the four determinants of national competitive advantage, Porter acknowledges two other influences

on national competitive advantage: chance and government. These two entities are not direct determinants, however. They influence national competitive advantage through one or more of the four primary determinants.

Like the RBV, the diamond model would suggest that an inventory of a region's competitive assets would need to include certain specific types of information. Most obviously, information related to the four determinants of competitive advantage should be cataloged. The way the elements of the diamond work togther as a system implies that the components of the resource inventory should not be analyzed in isolation. Rather, the complete inventory should be examined holistically, taking consideration of whether and how the component elements influence and reinforce each other. Finally, the diamond model points out that while government is not a direct determinant of competitive advantage, it indirectly influences the competitive advantage of industries under its jurisdiction. In any resource inventory, consideration should be given to government and its effect on regional competitiveness.

The RBV and Porter's diamond model apply generally to firms in all industries. In order to gain insight about resources and competitive advantage for agribusinesses specifically, an empirical study of the alumni of The Executive Program for Agricultural Producers (TEPAP) was conducted in 1999 and 2000. This study consisted of sixty semi-structured telephone interviews with large, progressive agricultural producers. This study was designed to investigate the resources and skills required to successfully produce and market differentiated agricultural products. (For a complete presentation of the empirical study, see Phillips.)

The TEPAP respondents who produce and market differentiated agricultural products mentioned several activities and assets that help them achieve competitive advantage. These

strategic elements can be grouped into four categories: customer intelligence-gathering, innovation, storage and delivery activities, and intangible assets. A complete overview of these categories follows.

Two activities that relate to customer intelligence gathering include networking and visiting customers. An example of networking is attending meetings with end users of differentiated agricultural products. Producers who do this benefit from the interaction by obtaining information about the products, special features, and services that will be demanded in the future. Visiting customers enables producers to find out their needs and to communicate the products and services they have to offer. In this age of fax and e-mail, one could argue that visiting customers has decreased in importance as a marketing activity. But surprisingly, the TEPAP respondents stressed the benefits of face-to-face, one-on-one contact in establishing and maintaining relationships with customers. All of these interactions with customers provide the opportunity for producers to promote themselves as progressive, responsible producers.

Other activities mentioned by product-oriented producers relate to innovation. Some producers mentioned engaging in experimentation, such as, field trials of new varieties. In one case, an end user hired a producer by the acre to grow an experimental variety, i.e., the payment was not contingent on the quantity of the product produced. Of course, in such cases the customer must have a great deal of confidence in the technical capabilities of the producer. Such confidence is usually built over time through repeated transactions. In certain instances, customers of the TEPAP respondents suggested innovative changes to producers' operations. For example, a potential customer asked if the TEPAP respondent could process and package a shipment of organic wheat. In another case, an egg producer was requested by his primary

customers to implement a HACCP system for ensuring food safety.

Certain storage and delivery activities performed by the TEPAP respondents were aimed at increasing customer satisfaction. Special storage facilities and skills are often required to keep different varieties segregated and identified. Information management is essential for producers of differentiated agricultural products, especially for those who store their products. Special capabilities may be required to track inventories that consist of multiple products, multiple varieties, and multiple quality classes of each product. Some of the TEPAP respondents mentioned that they provide special delivery services that are not traditionally provided in commodity agriculture. Perhaps the most basic method of differentiated delivery service is delivering products at the desired time on the desired day. Another example of this type of activity is rapid response delivery. Some TEPAP respondents distinguish themselves through special packaging and the fulfillment of small orders.

Activities such as networking, visiting customers, and implementing innovations in functions such as production, storage, inventory management, and delivery can have cumulative, positive impacts over time. Two assets that may be developed as a result of this process are intangible but potentially very valuable. First, relationships with customers are established and developed over time. While this intangible asset is difficult to measure, TEPAP respondents noted that customer relationships had a positive effect on customer decisions. Second, good performance in these activities leads to a good reputation, another intangible asset. Other buyers of agricultural products who are not current or former customers become aware of the reputation of a given producer. A positive reputation could be the determining factor when a buyer is selecting a new supplier. The concept of producer reputation, however, actually extends beyond

the population of current and potential customers. Producers have reputations among suppliers, other agricultural producers, and throughout the community. A producer's reputation among these non-customer groups can indirectly affect success at obtaining new business or commanding needed resources.

The TEPAP study suggests that a number of items should be included in an inventory of resources for product-oriented agriculture. First is the extent to which producers in the agricultural subsector under consideration engage in networking. To the extent possible, the resource inventory should include an assessment of the frequency, methods, and capacity of producers to network with end users to ascertain the products, features, and services that will be in demand, and to communicate their capabilities to provide these attributes. An inventory should also contain an assessment of the capability of producers to perform customized and innovative operations such as field trials, post-harvest processing, or special packaging. Being responsive to customer requests (e.g., for special product features or services) is pivotal in building relationships and establishing a positive reputation for a producer of differentiated agricultural products. For this reason, a resource inventory for product-oriented agriculture would be incomplete without some measure of the degree of responsiveness demonstrated by producers in the relevant subsector. Other capabilities addressed above should also be part of an inventory of resources for product-oriented agriculture. These include capabilities related to storage, segregation and identity preservation, logistics, responsive delivery, and information management.

3. Traditional Inventories of Agricultural Resources

Scholars at land grant colleges of agriculture and government analysts historically have produced inventories of agricultural resources. Some of these inventories use a state for the unit

of analysis and some have a national focus. This section will examine three inventories that have been compiled: the 1997 U.S. Census of Agriculture, the Status and Potential of Michigan Agriculture (SAPMA), and the Florida FIRST Base Papers. A brief description of the three inventories is included. The section will conclude with an examination of the information contained in these three inventories of agricultural resources, and a consideration of how well suited these traditional inventories of agricultural resources are for strategic decision making in differentiated agricultural markets. In particular, the limitations of past approaches for product-oriented agriculture will be specified.

The U.S. Census of Agriculture is the first example of a resource inventory for agriculture. Since 1840, the federal government has periodically taken a census of agricultural activity. Currently, the information is obtained using survey research techniques, i.e., by mailing out census report forms and having respondents mail back completed forms.

Michigan State University and the Michigan Agricultural Experiment Station undertook a project "to take inventory of relevant research, identify trends and future scenarios of Michigan agriculture, and appraise the potential for growth" (Ferris, p. 1). The Status and Potential of Michigan Agriculture (SAPMA) project is the second example of an agricultural resource inventory. It involved the efforts of approximately 70 faculty and graduate students at Michigan State from 1990 through 1992.

Another assessment of the agricultural resources of a state was produced by the University of Florida in 1999. The results of the study were published in an Institute of Food and Agricultural Sciences (IFAS) document titled *Florida FIRST Base Papers*. Florida FIRST (Focusing IFAS Resources on Solutions for Tomorrow) was a strategic planning project serving

the state's food, agricultural, natural, and human capital resources.

Table 1: Summary of the Type of Information Included in Three Inventories of Agricultural Resources. (Note: C of A = 1997 Census of Agriculture, SAPMA = Status and Potential of Michigan Agriculture, FIRST = Focusing IFAS Resources on Solutions for Tomorrow.)

Information Categories and Items Assessed (Total number of items assessed in each category was based on the total number of items used across the three traditional inventories)	***% of Items Included (No. of Items Included)***		
	C of A	***SAPMA***	***FIRST***
A. Agricultural Inputs (16 items, e.g., Land in Farms, Size of Farms, Market Value of Machinery/Equipment, Agricultural Chemicals Used)	69% (11)	56% (9)	25% (4)
B. Agricultural Outputs (20 items, e.g., Value of Output Sold; Yields for Field Crops, Fruits, and Vegetables; Value of Exports of Agricultural Products)	65% (13)	80% (16)	55% (11)
C. Demographic Information Regarding Farms and Farmers (17 items, e.g., Type of Organization, Tenure, Age of Operator, Selected Characteristics of Irrigated and Nonirrigated Farms)	94% (16)	18% (3)	0% (0)
D. Prices and Returns Related to Farming (9 items, e.g., Net Cash Return from Agricultural Sales, Government Payments and Other Farm-Related Income, Prices for Crops/Livestock)	22% (2)	100% (9)	0% (0)
E. Environmental Information (7 items, e.g., Land Use, Overview of Natural Resources, Air Quality Overview and Trends)	14% (1)	57% (4)	100% (7)
F. Consumer/Market Information and Projections (6 items, e.g., Value-Added and Value of Shipments; Overview of Trends in Technology and Management in Food Processing Industries; Population, Consumer Expenditure Situation and Trends)	0% (0)	67% (4)	100% (6)
G. Labor Force Information and Community Demographics (7 items, e.g., Hired Farm Labor: Workers/Payroll, Employment in Food Processing, Overview of Population Changes, Employment Trends)	14% (1)	43% (3)	43% (3)
H. Supply/Demand Projections (5 items, e.g., Projections of Per Capita U.S. Food/Fiber Consumption, Trends and Projections of Commodity Production, Value of Consumption of Food/Beverages)	0% (0)	100% (5)	20% (1)

I. Information, Trends, and Projections Related to Other Factors That Influence Agriculture (6 items, e.g., Projections of Federal Agricultural Policy; Trends and Issues Facing Major Commodity Industries; Dollar Contribution of Agriculture, Food, and Forestry to the Economy)	0% (0)	83% (5)	67% (4)

The contents of the three inventories of agricultural resources are summarized in Table 1. The information provided in these traditional resource inventories generally relates to the process of producing standardized outputs using standardized inputs. One conclusion that can be drawn directly from Table 1 is that the three traditional inventories are inconsistent in the type of data that are collected. Even as they relate to commodity agriculture, some topics that receive thorough coverage in one of the inventories are not addressed in a different inventory. The relevance of these inventories for product-oriented agriculture is now assessed.

As mentioned in the second section, the RBV provides four characteristics that resources must have to provide a sustainable competitive advantage (i.e., valuable, rare, inimitable, and nonsubstitutable). The U.S. Census of Agriculture (i.e., the Census) focuses on highly aggregated, standardized variables. Examples of the types of variables examined by the Census include land in farms, value of land and buildings, market value of agricultural products sold, and value of various agricultural commodities sold. These measures are highly aggregated due to the broad scope of the Census (geographically and the commodities/products considered) and the nature of the data collection process. The topics presented in SAPMA and Florida FIRST are somewhat more specific than those presented in the Census. For example, both of these resource inventories include information regarding the status and trend of aquaculture as well as overviews of trends in technology, management, and other issues in food processing industries. The

SAPMA and Florida FIRST reports also provide information on resources such as agro-ecological conditions that could potentially support a sustainable competitive advantage. But even SAPMA and Florida FIRST do not provide sufficiently detailed resource information to allow for a competitive advantage analysis based on the RBV. In particular, none of these three traditional inventories provides precise enough characterizations that would allow for an evaluation of the strategic value of resources. Further, the aggregated nature of the data presented in these three inventories does not allow for the consideration of rare resources. Thus, the first two characteristics necessary for resources to provide a sustainable competitive advantage according to the RBV (value and rareness) may not be ascertained through the three traditional inventories. None of the three traditional inventories consider whether resources are the product of unique historical circumstances or whether the process of how certain resources lead to competitive advantage is causally ambiguous. All of these factors limit the usefulness of the traditional inventories for developing product-oriented strategy by agricultural firms.

As mentioned in the second section, Porter's diamond model includes four determinants of competitive advantage (factor conditions, demand conditions, related and supporting industries, and firm strategy, structure, and rivalry) and government, which influences competitive advantage. Because its data is collected from agricultural production firms, the Census contains no information about demand conditions, related and supporting industries, or government. The SAPMA and the Florida FIRST reports give some consideration to factor conditions, supporting industries, and customer groups. The information provided, though, is not detailed enough to do a full analysis based on Porter's diamond model. Further, it would be useful to have an evaluation of how innovative the firms are in industries that provide inputs to agricultural producers in the

region under consideration and how demanding and sophisticated local customers are. This type of information is not included in the SAPMA or Florida FIRST reports. In addition, the role of government is not adequately addressed in either SAPMA or Florida FIRST. For example, when agricultural policy is addressed in the SAPMA or Florida FIRST reports, it is done at a national level. While national laws and regulations can significantly affect the competitiveness of production agriculture of a nation, they have much less effect on inter-regional competitiveness. Finally, none of the three traditional inventories examines the interaction among the determinants of competitive advantage, including whether and how each element reinforces the others. For all of these reasons, the three traditional inventories do not provide enough information related to Porter's diamond model for them to be useful strategic planning tools for product-oriented agricultural firms.

The TEPAP empirical study of agricultural producers identified resources necessary to succeed in the production and marketing of differentiated agricultural products. Several of these resources are not included in these three prior efforts to inventory agricultural resources. For example, no mention is made of information resources or information management in any of the three traditional inventories. The Census does not address human capital resources. While SAPMA and Florida FIRST mention human capital resources, the information provided in these inventories is not sufficiently detailed to be of strategic value to product-oriented agricultural producers. For example, neither SAPMA nor Florida FIRST addresses the capacity of agricultural producers in their respective regions to network or visit customers, or how innovative producers are in production and delivery. The TEPAP interviews indicated that marketing resources are important in product-oriented agriculture. An example of these resources is

producers' reputations for quality and service. The topic of marketing resources, however, is also not addressed by the three traditional inventories.

Due to the deficiencies and limitations discussed above, the three prior efforts to inventory agricultural resources are not particularly well suited for strategic planning in product-oriented agriculture. Other information, not included in these inventories, must be collected and presented to support strategic management in product-oriented agriculture.

4. A New Resource Inventory Framework for Product-oriented Agriculture

Because of the deficiencies of prior inventories, a new approach is needed, at least to address product agriculture's needs. A proposed alternative resource inventory framework for product-oriented agriculture will now be introduced based on the RBV, Porter's diamond model, and the empirical study of TEPAP producers. This framework is a theoretical contribution in that it represents a significantly different approach than past efforts, and is grounded in the most relevant management theories. The resources in the proposed inventory framework are divided into two primary categories: "Less-controllable Resources" and "More-controllable Resources." The first primary category, less-controllable resources (LCRs), may be defined as assets over which individual firms have incomplete power to regulate and direct. While firms (either individually or collectively) may have some degree of influence over LCRs, they do not have unrestricted command over them. This primary category is mainly comprised of resources that are elements of the external environment of the firm. In contrast, more-controllable resources (MCRs) are assets over which individual firms have general authority to regulate and direct. Individual firms have substantial control over the deployment (or use) of MCRs. This primary category is mainly comprised of resources that are internal elements of individual firms. The two

primary categories of resources are described more fully below. In particular, the critical items to inventory for product-oriented agriculture (versus commodity agriculture) are emphasized.

5.1 Less-controllable Resources (LCRs)

Most of the resources in this category are suggested by Porter's diamond model, but some resources unique to agribusiness are also included. In accordance with Porter's diamond model, the less-controllable resources are related to the geographic location of the agricultural firm or subsector under consideration. There are six categories of resources within the primary category of LCRs. These subcategories are listed in Table 2.

Table 2: Types of Less-controllable Resources.

Less-controllable Resource Category	***Examples***
1. Agro-ecological Resources	Micro-climatic zone, lack of pest pressure
2. Access to a Beneficial Labor Supply	Supply of available workers in the area who have skills and experience related to agricultural product production
3. Institutional Infrastructure	Advantageous tax treatment, lenient regulation
4. Physical Infrastructure	Well developed system of roads and railroads
5. Access to Beneficial Markets	Nearby processor(s), final consumers, as applicable
6. Access to Beneficial Related and Supporting Industries	Nearby production input suppliers, consultants, financial institutions, etc.
7. Support Infrastructure	County and state extension personnel, university experts

The first category of resources in Table 2, agro-ecological resources, is specific to agribusiness. These resources are important for agricultural production firms, especially in crop production. Agro-ecological resources are so important to agricultural production (in contrast to non-agricultural manufacturing) that they warrant explicit consideration in a resource inventory.

An example of an agro-ecological resource that could be important in product-oriented agriculture is soil with unique properties that allows the production of crops with outstanding quality characteristics (e.g., flavor).

Because labor is an essential input for agricultural production firms, the second category of LCRs is access to a beneficial labor supply. One example is the availability of seasonal workers in some agricultural production enterprises. Access to a beneficial labor supply is characterized by the labor market conditions facing the firms in the agricultural subsector being studied. The labor supply that makes up this category is the pool of workers available for expanding or newly-formed firms. It does not include the human capital resources that are employed by firms in the subsector under consideration, which will be considered as a separate type of MCRs below.

The third category of LCRs is the institutional infrastructure, or rules of the game. The institutional infrastructure is comprised of all of the laws, rules, and policies that are in effect in the region that is being inventoried. This category of resources is related to the government element in Porter's diamond model. Because of the wide range of activities involved in agricultural production, the scope of the relevant institutional infrastructure is quite vast. It includes practically the entire set of laws, rules, and policies that apply to non-agricultural manufacturing. This includes tax law, labor law, and policies for motor vehicle registration (among others). But due to the degree to which land is required for agricultural production, all land use and environmental laws, regulations, and policies also apply.

The fourth category of LCRs is physical infrastructure. This category includes such things as roads, railroads, deep seaports, airports, telecommunications infrastructure, and customs offices. It should be noted that the items in this category are *public* infrastructure, generally

available to all firms in a region. One area in which physical infrastructure could have a positive impact is in facilitating just-in-time delivery of perishable products. For example, Kenya has developed a sophisticated air transport system to allow for the timely delivery of cut flowers to European markets (Kimenye).

The preceding subcategories of LCRs have all pertained to supply-related issues. No resource inventory would be complete without addressing demand. For this reason, access to beneficial markets is included as a category of resources in the inventory. Access to beneficial markets is related to Porter's demand conditions. To establish a clear picture of the markets in a particular state or region, a resource inventory should include certain basic information that characterizes demand at different downstream levels. Of course, this information will vary depending on the agricultural product under consideration. For studies involving fresh fruits and vegetables, the basic information will include the number of end consumers in the study area as well as a description of industries that make up the supply chain. In this case, these industries include the packing and shipping industries, the part of the retail food industry that markets fresh produce, food service distributors, the restaurant industry, and the institutional food service industry. As mentioned above, it is better for an industry to have demanding and sophisticated customers located nearby.

The access to beneficial related and supporting industries category of LCRs arises directly from Porter. Related industries are defined as ". . . those in which firms can coordinate or share activities in the value chain when competing, or those which involve products that are complementary" (p. 105). Related industries can benefit a given industry if they can share activities such as technology development, manufacturing, distribution, marketing, or service

(Porter). In product-oriented agriculture the availability of certain specialized, sophisticated inputs may contribute to the competitiveness of a subsector in a specified location. Examples of such inputs include consulting services and financial services tailored to the needs of agricultural producers who produce differentiated products.

The final category of LCRs is the support infrastructure. It is comprised of nearby government agencies and nonprofit organizations that could benefit an agricultural subsector. There are a substantial number of government organizations at the state level that assist agricultural firms: state departments of agriculture, land grant colleges of agriculture, and agricultural experiment stations. In particular, cooperative extension services have a statewide presence as well as county offices staffed by specialists in various fields that can substantially benefit agricultural producers.

5.2 More-controllable Resources (MCRs)

This section considers resources that agribusiness firms have greater control over, as compared to the resources examined above. MCRs are generally internal to firms. While agribusiness decision makers have a great degree of control over the resources described below, it should be noted that they do not have *complete* control over them. The five subcategories of MCRs are listed in Table 3. These resource categories are drawn primarily from the RBV.

Table 3: Types of More-controllable Resources.

More-controllable Resource Category	***Examples***
1. Physical Capital Resources	Specialized packaging equipment, special storage facilities
2. Financial Capital Resources	Liquid funds and lines of credit
3. Human Capital Resources	Workers of varying skill levels employed by firms

4. Marketing and Information Resources	Databases containing information about customer needs, networks of customer contacts
5. Organizational Capital Resources	Socially complex and causally ambiguous processes within firms

The first category of MCRs is called physical capital resources. These are the tangible tools, equipment, computers, vehicles, buildings, and other facilities possessed by firms in the subsector under consideration. A listing of general purpose tractors, barns, and other physical capital resources would suffice for commodity agriculture. To be informative for strategy development in product-oriented agriculture, however, an inventory of physical capital must be much more detailed and focused. Such an inventory should include, if applicable, the physical capital resources in a subsector that are advanced and specialized factors of production.

The second category of MCRs is financial capital resources. Financial capital is "all of the different money resources that firms can use to conceive of and implement strategies." (Barney, 1997, p. 143). This includes both equity and the firm's ability to attract debt capital. Sources for equity capital include entrepreneurs, venture capitalists, individual investors, and retained earnings. Debt capital may also be obtained from different sources, including individual investors, public or quasi-public economic development organizations, and a myriad of different types of private financial intermediaries.

Human capital resources make up the third category of MCRs. Human capital is comprised of the experience, insight, intelligence, judgement, relationships, and training of *individual* managers and workers in a firm (Becker). The supply of workers available to firms in an agricultural subsector was covered in Section 5.1 above. Thus, the human capital resources

described in this part of the inventory are workers and managers currently employed by firms in the agricultural subsector under consideration. The TEPAP interviews indicated that product-oriented agricultural producers need to have skills related to innovation and experimentation. Further, customer service (an important function in product-oriented agriculture) is enhanced when employees have the ability to think critically and to effectively solve problems.

Due to the broader scope of marketing in product-oriented agriculture and the emphasis the TEPAP respondents placed on marketing skills and resources, a separate category of MCRs is made up of marketing and information resources. The TEPAP respondents indicated that communication skills are necessary to succeed in marketing differentiated agricultural products. Along these lines, producers must be able to determine customers' needs, to communicate the special features and benefits of products, and to negotiate with customers regarding prices and requirements for special quality, features, or services. Product-oriented agricultural producers also need networking skills and research skills. This category also includes information resources. An example of an information resource is a proprietary customer database that includes names, addresses, demographic information, purchase history (including product type, quality, and volume), delivery requirements, and other preference information.

The fifth category of MCRs is called organizational capital resources. While human capital resources reside in *individual workers and managers*, organizational capital resources reside in *collections* of individuals (Barney, 1997). Organizational capital resources include the administrative framework of firms, e.g., the structure of reporting relationships, standard operating procedures (SOPs), and the like. This category of resources also includes a firm's formal and informal systems for planning, controlling, and coordinating; its culture and reputation;

and relationships both among groups within the firm and also between the firm and elements of its environment (Tomer). Two examples of organizational capital resources, relationships with customers and a reputation for quality and service, were mentioned by the TEPAP respondents.

5. Application of the Resource Inventory Framework

The proposed resource inventory requires the assessment of several constructs that are difficult to quantify. An example of this related to human capital resources is the level of experimentation and innovativeness of agricultural producers. This difficulty will influence how information on certain inventory items will be gathered and evaluated. Further, it will also impact the presentation format of these items. It will be necessary to describe certain inventory items using qualitative categories, such as "highly competitive," "adequate," or "deficient."

Another issue related to operationalizing the resource inventory relates to who (or what type of organization) should undertake various inventorying activities. Ideally, an inventory of subsector resources should be accomplished by representatives of both public and private organizations. Some of the information required for the resource inventory is general in nature, in that it applies to nearly all firms in a specified geographic area and is observable (or accessible) by non-participants in the subsector. This information, which usually pertains to less-controllable resources, is best collected, analyzed, and presented by representatives of public agencies. If a public agency performs these functions, the potential obstacle of organizing a group to carry out the tasks (while avoiding free riding) is sidestepped. Examples of public agencies that are prime candidates for performing these inventorying tasks include academic departments in universities and state departments of agriculture.

Other information, which generally applies to more-controllable resources, is not accessible to public agencies because of its proprietary nature. Thus, private organizations are better able to inventory the MCRs. The specific private organization best suited for the task will vary depending on the subsector being studied and other considerations. These considerations include the capabilities of the various parties or organizations who could inventory the resources and who is likely to benefit from the study. It could be a commodity group, a cooperative, a partnership comprised of agricultural producers, or a consulting firm hired by one of these organizations.

Questions remain as to what are the essential steps in completing the resource inventory, and what is the proper sequence of activities. This information, along with who should be responsible for each activity, is summarized in Table 4.

Table 4: Implementation Steps for Resource Inventory Studies, Including Responsibility for Each Step.

Step	Activity	Primary Responsibility
1	Establish public/private study partnership.	Public Group
2	Delineate the boundaries of the study (vertically, horizontally, and product scope).	Joint
3	Create master blueprint of data needed for the inventory.	Public Group
4	Obtain pertinent secondary data sets.	Public Group
5	Identify gaps between available data and what is necessary to complete study.	Public Group
6	Assign responsibility for collecting necessary data.	Joint
7	Develop and implement survey research instruments, as needed.	Both groups, as indicated in Step 6
8	Analyze data and generate report(s).	Joint

9	Extract strategic implications from study, make necessary adjustments to strategic plan, and implement specific action plans.	Private Group

The time required to complete a resource inventory will vary depending on the subsector selected, the number of personnel involved, and the related experience of the groups. Due to the learning curve effect and the departure from traditional agricultural resource inventories, the cost for the initial studies for each group may be substantial. It is beyond the scope of this article to develop a full cost budget for the exercise; however, such a budget and funding sources would be critical to ultimate implementation.

On the other hand, significant benefits may result from a resource inventory study. One important benefit is the identification of new, high-value, specialized markets for the agricultural products produced in the subsector. Additionally, opportunities may be perceived for adding value locally through producing products with special features, processing products, or performing customer service activities. If subsector participants successfully capitalize on such opportunities, firms in the area may earn increased profits, local jobs may be added, and the tax base enhanced. Even if firms in the relevant subsector do not immediately change their strategies based on the study's results, they still may benefit in the long run. Specifically, the private group employees who engage in study activities and other subsector participants who are involved may significantly improve their business strategy skills. Incremental skill development may lead to better strategy formulation and implementation in the long run, which will create similar benefits. The type and quantity of benefits will also vary depending on the competitive potential of the

subsector under consideration. To maximize the potential for benefits, care should be taken to select a subsector whose products can be marketed to customers with high-value uses, and that have shown supply growth locally and demand growth nationally or globally.

6. Management Implications

All of the resources described in Sections 5.1 and 5.2 influence the performance of agricultural production firms. Beyond merely giving a picture of the strategic position of an agribusiness firm, the resource inventory provides a general framework for strategy formulation. Specifically, the agribusiness decision-maker's problem can be stated as follows: "Given the set of less-controllable resources that apply to my agribusiness firm, how can I best organize and adapt my more-controllable resources to achieve my strategic goals?" Ideally, agribusiness firm strategy assures a fit between the less-controllable resources and the more-controllable resources. Agricultural producers should strive to *know and understand* the relevant LCRs and effectively *assemble and deploy* a set of MCRs to take advantage of them. While producers and producer organizations have some degree of control over resources such as the institutional infrastructure (e.g., tax and regulatory policy), they would likely be better served by taking action to upgrade their MCRs. For example, producers can benefit by supporting factor-creating mechanisms, such as, programs and organizations that enhance human capital resources.

7. Summary and Conclusions

The transformation of agriculture from the production of standard commodities to the production of products with special features or attributes, intended for specific end uses, has been well documented. This change has had a significant impact on agricultural producers. In

particular, a new set of resources and skills are required to effectively compete in differentiated agricultural product markets.

Three prior efforts to inventory agricultural resources were reviewed in some detail. Based on management theory [i.e., Porter's diamond model and the Resource-Based View of the Firm (RBV)] and an empirical study of agricultural producers who are involved in product-oriented agriculture, these prior efforts were shown to have limited usefulness to decision makers in differentiated agricultural product industries. A new resource-inventorying process was introduced, founded upon these two management theories and the empirical study and specifically designed to be useful to decision makers in product-oriented agriculture.

The primary conclusion of this article is that the resource inventory for product-oriented agriculture introduced in Section 5 should be used to provide strategic information in certain circumstances. In particular, if a preliminary analysis indicates that agribusinesses in a given region could benefit by pursuing opportunities in product-oriented agriculture, then compiling the information in the resource inventory introduced is likely warranted. A secondary conclusion is that the U.S. Census of Agriculture and state level efforts to inventory agricultural resources should be modified to include at least some of the resources described in Section 5, if they are intended to provide information to support differentiated agricultural product markets.

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