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## **Developments and Development Directions of Electronic Trade Platforms in US and European Agri-Food Markets: Impact on Sector Organization**

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### **Abstract**

Electronic trade platforms support trading transactions between enterprises. They have entered the business landscape including the agri-food sector only a few years ago. However, there already have been dramatic changes in the agri-food sector's platform infrastructures. This paper analyzes developments in electronic trade platform infrastructures in the agri-food sector of the US and Europe between 2000 and 2002 and identifies development strategies of successful platforms. Of 85 platforms in existence in the year 2000, only 25 remained active in 2002. But there are still market entries of new platforms and existing platforms form various types of partnerships. The analysis could identify a range of strategic development lines of successful platforms. Initiating cooperation with other platforms on the use of specific features and the development and use of standards, gaining support by major market participants, the improvement of trading functionalities and the expansion of value-added services are the primary lines of development and evolvement of platforms. Platform evolvement tendencies and the present occurrence of the trade platform infrastructure allow for projecting the emergence of an agri-food sector with embedded, interconnected e-commerce infrastructure or mega-hub leading towards a more networked agri-food industry.

**Keywords:** electronic commerce, electronic trade platforms, agri-food markets

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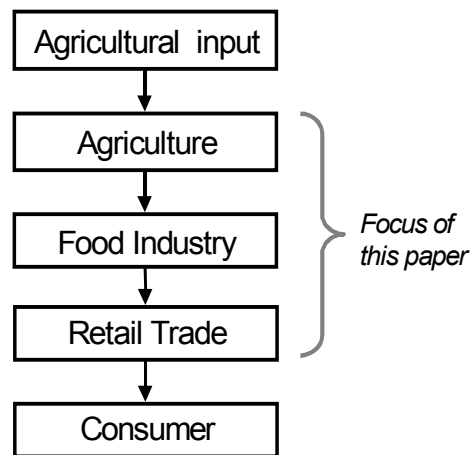
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## Introduction

The provision of food builds on a vertical chain of subsequent production, service and trading processes that reach from the production of agricultural inputs to the delivery of final food products to consumers (food supply chain, FSC). Enterprises at various stages of this chain contribute to the production and service processes and exchange or trade goods with their suppliers and customers. Basic models of the food supply chain (Davis et.al, 1957; Zylbersztajn, 1996; McCorriston, 2002) specify a number of distinguished stages and the market linkages between them (fig. 1).



**Figure 1:** General Food Supply Chain Model  
(adapted from McCorriston, 2002)

Faced with challenges from increases in globalization, competition, and market concerns regarding food quality and food safety, enterprises in food supply chains need to adapt their traditional business models and improve the efficiency of processes and their interaction throughout the supply chain. Key success factors involve improvements in the information and communication infrastructure of enterprises and the food supply chain, and the utilization of opportunities provided by modern information and communication technologies (ICT). In utilizing ICT support, emphasis was initially on internal processes of enterprises. However, the advent of the Internet communication network has opened new support opportunities with high improvement potential specifically for trading and interaction activities on all levels of the supply chain.

These opportunities are commonly referred to as ‘E-Commerce’ and focus on all types of trade-related activities, either between enterprises (for a food chain related discussion of ‘B2B e-commerce’; see, e.g., Schiefer et al., 2001, Leroux et al., 2001, Boehlje et al., 2000 or Mueller, 2000 for) or between enterprises and consumers at the end of the food supply chain (‘B2C e-commerce’, see, e.g., Sawhney, 1999 or Duval, 2001). Trade-related activities that deal, a.o., with the marketing, selling,

buying, and servicing of products could be supported by Internet-based 'electronic trade platforms' (ETPs) (Schiefer, 2000), i.e., electronic trade support systems that match vendors and buyers, intermediate trading transactions up to contract conclusion, and provide the institutional infrastructure that is in line with the legal and technical environment (Bakos, 1998, Kaplan, Sawhney, 2000).

The emergence of electronic trade platforms is closely linked with the dynamic Internet developments during the period known as 'New Economy' that reached its peak in the year 2000. Platform applications developed in all sectors of the economy, including the agri-food sector, and their general acceptance as the primary support base for trade-related activities seemed to be imminent. However, acceptance has been much lower than expected and the development paths of electronic trade platforms were not as straightforward as initially envisaged.

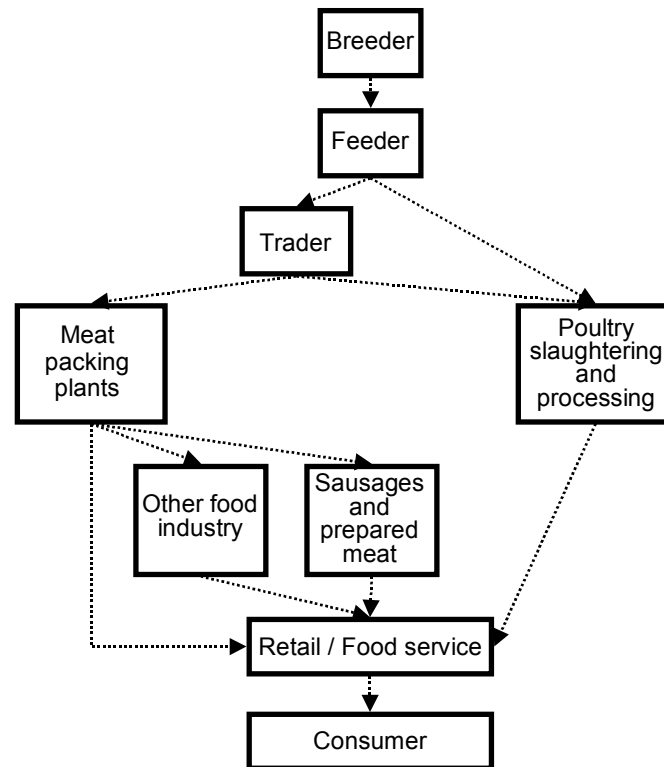
The agri-food sector is no exception. With a view on the discrepancy between expectations on potentials of electronic trade platforms and actual developments, it is the objective of the paper to gain some understanding of the development directions of trade platforms and their interaction with the agri-food sector to better utilize the support potential of electronic trade platforms in the future. Observed changes in electronic platform infrastructures allow a first analysis of the situation and possible development directions of platforms and a possible impact on the agri-food sector's organization. This is especially true for the US and Europe where the majority of electronic trade platforms were located and engaged in the year 2000. Specifically, the paper analyzes developments in electronic trade platform infrastructures in the agri-food sector of the US and Europe between 2000 and 2002, identifies development strategies of successful platforms, and discusses emerging consequences and implications for the organization of the agri-food sector. The analysis covers food supply chains from agriculture to the retail sector and integrates different product lines. This allows for considering trade platforms that offer their services at different stages of the supply chain and engage in trade support for different product lines simultaneously.

The paper introduces into the subject through an overview discussion of the general food supply chain infrastructure and its link with electronic trade platforms, the direction and type of analysis with its corresponding database, and the framework used for the analysis (section 2). The following sections discuss the results of the analysis regarding developments in the electronic trade platform infrastructure in the agri-food sector of the US and Europe between 2000 and 2002 (section 3) and the identification of development strategies of successful platforms (section 4). The paper concludes with a discussion of emerging implications from electronic trade platform development strategies for the future organization of the agri-food sector (section 5).

## Framework for Analysis

### *The Focus*

The principal organization of food supply chains in the agri-food sector follows the basic model described above. However, on the more disaggregated level of enterprise activities, the sector shows a great variation in supply chain organizations between different product lines such as meat, dairy, cereal, or produce. Different requirements on production and trading environments of different product lines influence and alter the basic chain model, especially at the industry level.



**Figure 2:** North American Industry Chain Model

An example of a general chain model of the US meat supply chain illustrates the differentiation at the industry level to adapt to the particulars in the production, processing, and marketing of meat (fig. 2). The model is derived from the North American Industry Classification System (NAICS) and its classification of the food manufacturing industry.

Electronic trade platforms are not yet part of the model. They are entities, and usually enterprises, in their own right but a new addition to the supply chain infrastructure. Initially, they have their place in the linkages between the supply chain enterprises.

### *Direction of Analysis*

The analysis of developments of electronic trade platforms in the agri-food sectors of the US and Europe builds on two lines of analysis:

1. Analysis of variations in the platform infrastructure.
2. Analysis of development strategies of successful platforms.

Developments and development directions of electronic trade platforms build a basis for the discussion and estimation of middle-term implications and consequences from evolving platforms for the agri-food sector's organization (see section 5).

### **Analysis of Variations in the Platform Infrastructure**

The analysis focuses on variations and developments in the agri-food platform infrastructure between 2000 and 2002. The aim is to identify some principal development patterns in the agri-food platform infrastructure as a basis for the further analysis of successful platform development initiatives. The analysis tracks and examines development paths of agri-food trade platforms including market exits and market entries. It provides a dual view: it follows the development paths of 85 electronic trade platforms that were active in 2000 and identifies the development history of 36 electronic trade platforms active in 2002, including those that entered the market during the analysis period. These platforms represent an almost complete coverage of the platform market. The analysis builds on an earlier analysis of electronic trade platforms in the meat and cereal markets (Fritz, 2000a, Fritz, 2000b, Fritz et al., 2001), but includes all major agri-food product lines.

### **Analysis of Development Strategies of Successful Platforms**

The analysis of development strategies of successful platforms aims at the identification of predominant strategic elements of agri-food platforms that successfully acted in the 2000 / 2002 period. The analysis follows an elaborate framework for analysis outlined in the following chapter and builds on the accessibility of sufficient information regarding individual platform developments. A successful electronic trade platform would be one involved in actual agri-food transaction activities that successfully stabilized or even improved its position between 2000 and 2002. Of the 25 electronic trade platforms that existed in 2000 and remained active during the analysis period, nine matched these criteria and could be used in the analysis. Electronic trade platforms may follow specific

straightforward development strategies or a broader spectrum of strategy combinations.

The combination of the results of the two different types of analysis provides a picture of developments and development directions. Their focus, objectives, approach and database are summarized in table 1. Developments and development directions represent the basis for the discussion and estimation for middle-term sector implications.

**Table 1:** Overview on Focus, Objective, Approach and Database of Analysis

| <b>Focus</b>                                   | <b>Objective</b>                                    | <b>Procedure</b>   | <b>Database</b>                             |
|--|---|--|---|
| Variations of platform infrastructure          | <i>Platform infrastructure development patterns</i> | Monitoring of platform market situation                            | Platforms active in 2000 (85) and 2002 (36) |
| Development strategies of successful platforms | Strategic elements of successful platforms          | Monitoring of platforms based on multi-criteria analysis framework | Selected platforms active in 2000/2002 (9)  |

### *Framework of Platform Analysis*

The specification and analysis of trade platform characteristics has been discussed before (Kaplan et al., 2000, Grieger, 2003). Platforms are differentiated based on characteristics that might focus on the composition of the trade portfolio (vertical or horizontal platforms), on the type of sourcing (spot sourcing or systematic sourcing), the pricing rules (fixed prices or dynamic pricing alternatives), or the market orientation (buyer-oriented, seller-oriented or neither). However, these general frameworks for analysis do not account for the specifics in the agri-food sector with its complex industry infrastructure (e.g., small farms vs. multinational companies), its mix of different product lines (single product vs. multi-product), the complexity in supply chain organization or other aspects that might be necessary for a thorough analysis of agri-food electronic trade platforms.

The study presented in this paper employs a platform analysis framework (Hausen et al., 2002, Hausen, 2002) that builds on the general framework but integrates considerations with special relevance to the agri-food sector. The suitability of the framework has been developed and demonstrated through experimental platform evaluations, in which the results of a strict application of its rules were matched against the results of an expert analysis. Key dimensions of analysis include a platform's market orientation, implementation mode, organizational structure, and process organization. Each of these dimensions represents a set of platform characteristics (analysis criteria) that could be directly identified (Table 2).

**Table 2: Platform Characteristics in the Analysis Framework**

| Market orientation                          | Implementation mode              |
|---|----------------------------------|
| Market specifics                            | Top-down                         |
| Agri-food                                   | Bottom-up                        |
| Vertical stages of chain                    | Process organization             |
| Along whole chain <sup>1)</sup>             | Value-added services (VAS)       |
| Stage specific                              | Transaction support              |
| Product categories                          | Logistics                        |
| Agri-food products general                  | Finance                          |
| Specific products only                      | Negotiation                      |
| Non-food                                    | Multimedia                       |
| Operating radius                            | Provision of information         |
| Regional                                    | Market information               |
| National                                    | Process information              |
| Continental (Europe, North America)         | Supply chain management          |
| Worldwide                                   | Coordination mechanisms          |
| Organizational structure                    | Dynamic (auction etc.)           |
| Cooperation with other ETPs                 | Static (catalogue)               |
| Ownership                                   | Mixed (e.g., RFX <sup>3)</sup> ) |
| Neutral                                     | Revenue model                    |
| Market participant                          | Joint investment by members      |
| Single enterprise                           | Fee for VAS                      |
| Consortium                                  | Fee time-based membership        |
| Organizational form                         | Fee transaction-based            |
| Seller/buyer n:1                            |                                  |
| Seller/buyer 1:m                            |                                  |
| Seller/buyer n:m (n>>m; n<<m) <sup>2)</sup> |                                  |
| Seller/buyer n:m (n~m)                      |                                  |

Remarks:

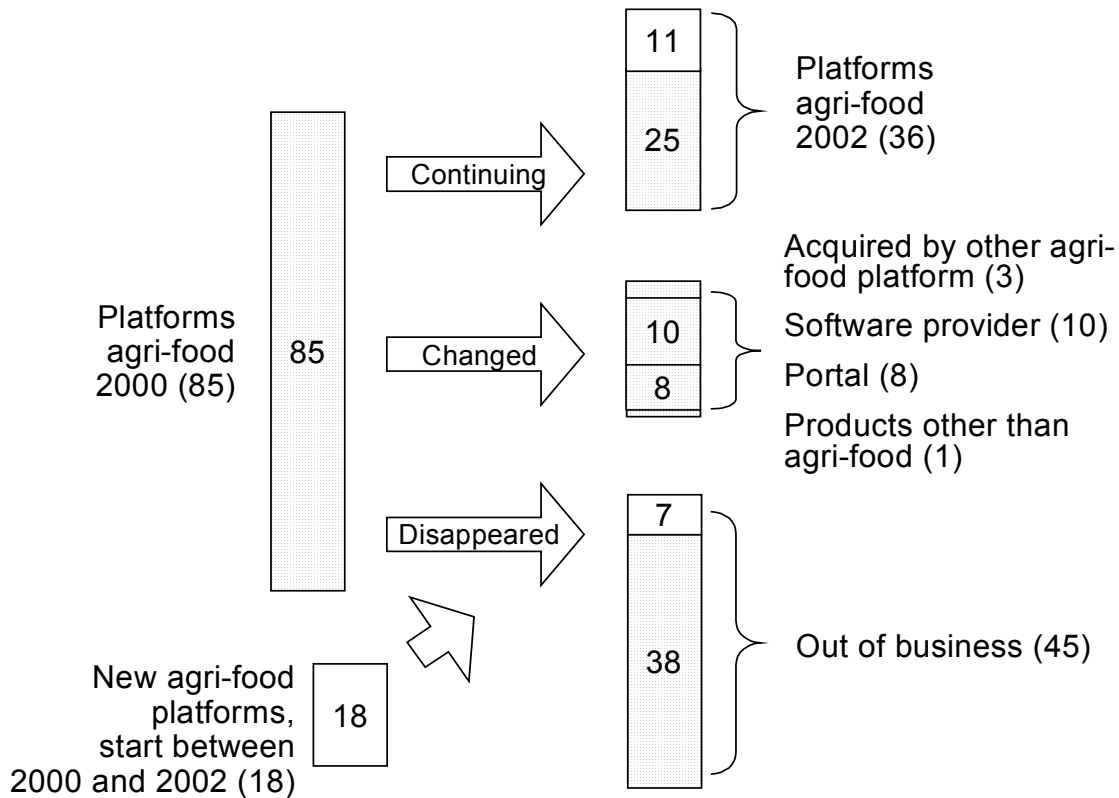
<sup>1)</sup> Baseline characteristics in italics<sup>2)</sup> n>>m: n fragmented compared to m<sup>3)</sup> RFX: Request for (quote etc.)

## Variations in the Platform Infrastructure During 2000/2002

The agri-food platform infrastructure in the US and Europe has dramatically changed during the short period between the years 2000 and 2002 (fig. 3). Only about 30% (25) of the 85 platforms identified in 2000 remained as trade platforms in 2002. About 45% (38) went out of business altogether, about 25% (19 platforms) changed their focus to activities other than trade platform or merged with other platforms (3). Furthermore, of the 36 agri-food platforms existing in 2002, about 30% (11) entered the market after the year 2000. This result contradicts the notion of a 'first mover advantage', an observation that has been made by others as well with regard to Internet-related businesses (Liebowitz, 2002, Gallagher et al., 2000).

The combination of platform closures at one hand and new entries at the other hand might indicate deficiencies in business models of early platform enterprises that new entries might have avoided. However, late entrance was no guarantee for success. Of 18 platforms that entered the market after the year 2000, only 11 remained active whereas the others (almost 40%) discontinued their activity shortly after their market introduction.

A more detailed analysis regarding mergers, change of business model or discontinuation of activities shows the following picture:



**Figure 3:** Tendencies in the Platform Market Between 2000 and 2002

### *Mergers Between Platforms*

In the US, several mergers between agri-food platforms have occurred. As far as one can conclude from the outset, interests of platform enterprises in competitors could be linked to specific interest in their customer base and / or platform technology. As an example, *Farms.com*, a U.S.-based platform for agricultural commodities, merged with the Canadian platform *eHarvest.com*, involved in piglet trading, and the platform *CyberCrop.com*, involved in grain trading, to reach their customers. The platform *Dairy.com*, on the other hand, merged with *Inc2inc* for access to their advanced trading and exchanging technology.

### *Change of Business Model to other than Platform*

A major development alternative for platforms involves a reorientation of their business model to an activity other than trade platform. Principal alternatives involved the transformation into software development or the organization of information portals for the agri-food sector. In software development, companies



primarily engaged in management software for food supply chains. An example is *emergeInteractive* with its *CattleLog* software. *CattleLog* supports the tracking of cattle and beef and developed out of the former *CattleInfonet* platform that supported the trading of cattle, beef and beef products across the entire meat value chain. Other examples with similar developments include *eSkye*, *Novopoint*, *E-Markets*, *ecMarkets*, or *Instill*. Platform initiatives that developed into agri-food related information portals include the US-based portals *Beverage Online*, *Bakery Online*, and *Foodservice.com*. The former European platforms *Fleischforum* and *FoodCity.Ru* have changed into agri-food company directories.

### *Discontinuation of Activities*

Most platforms that seized with trading support discontinued their activities altogether. The majority of them were initiated as focused platforms dealing with one or a few product lines like meat, cereals or organic products, a strategy that was generally considered as the most promising approach. Some of them were even backed by major actors in the sector, like, e.g., *Rooster.com* which was initiated by the agri-food company Cargill as a platform for farm retailers, cooperatives, and food industry. Other North American platforms that discontinued activities include, a.o., *SellMeat.com*, *ICSFoodOne*, *Buybreads.com*, *FoodUSA.com*, and *Poultryfirst.com*. European examples involve *Efoodmanager*, *Efdex*, *Agrenius*, *Grownex*, *UnitednatureX*, *Tradeorganex*, and *Cigrex*.

### *New Platform Entries*

The emergence of new platform initiatives during the analysis period while other platforms were discontinuing activities and the subsequent closure of some of the newly created platforms soon after their establishment reflects and supports the position that the development of electronic commerce needs to pass through a series of trial-and-error processes (Snyder Bulik, 2000) to mature and to appropriately adapt to the needs of the sector. Experiences from failed projects are the basis on which new project initiatives could build.

In summary, this analysis of developments in the agri-food trade platform infrastructure demonstrates high dynamic and principal paths. Many platform initiatives failed during the analysis period, even platforms initiated or financed by major market participants. The developments do not allow the identification of only one or a few major reasons for platform failures: consolidation in the agri-food platform market, lack of platform acceptance, inadequate platform functionalities, and a declining economic situation may all have contributed to platform failures. However, the analysis of variations and tendencies in the platform infrastructure does not provide clear patterns of development directions of continuing platforms themselves. This requires a more detailed analysis of development strategies for success.

## Development Strategies for Success

This section takes a closer look to trade platforms successful in the 2000 / 2002 period and their areas and elements of evolution and development. An analysis following the framework discussed in section 2.3 could build on data from nine platforms with successful operations during the analysis period and has revealed seven predominant platform development strategies. These lines are those platform elements where most of the changes have occurred during the period 2000 / 2002. The successful platforms usually followed several development strategies simultaneously.

The development lines fall into two categories, ‘primary development strategies’ that were followed by the majority of the platforms, and ‘secondary development strategies’ followed by at least one quarter of them (Table 3). The primary development strategies distinguish between two different groups of initiatives:

- initiatives that deal with *platform cooperation* on the joint use of specific platform features or the joint development and use of standards and
- initiatives that deal with *platform improvements*.

**Table 3:** Development Strategies of Successful Platforms

| Primary development strategies               | Secondary development strategies  |
|--|-----------------------------------|
| Cooperation with other platforms             | Technology partnerships           |
| Sharing of features                          | International expansion           |
| Joint development of standards               | Increased competence of personnel |
| Gaining support by major market participants |                                   |
| Improvement of trading functionalities       |                                   |
| Expansion of value-added services            |                                   |

### *Cooperation for Sharing Specific Features*

Cooperation initiatives for the joint use of specific features occur primarily between comprehensive platforms dealing with a broad range of products on one side and specialized, small platforms that are particularly well adapted to the trading processes of specific goods on the other side. The comprehensive platforms use the specific technology provided by the specialized platforms, the specialized platforms benefit from the increase in transactions brought to them. Examples include *WWRE* and *GNX*, large retailer consortium platforms that perform their transactions in perishables on the *Agribuys* and *iTradeNetworks* platforms, respectively.

### *Cooperation on the Development and Use of Standards*

Cooperation on the development and use of standards involves

- standards for product description and
- standards for transaction processing and organization,

both prerequisites for platform interoperability. In the joint development of standards, the cooperation usually involves not only the cooperating platforms but, in addition, standardization organizations such as the Uniform Code Council (UCC). Product description standards allow the standardized description of products and their characteristics (Maskus et al., 2000, David et al., 1990) and, in turn, a reduction of transaction costs (Barzel, 2002, Jones et al., 1996). Initiatives for the development and use of product description standards are supported by major platforms such as *Transora*, *CPGmarket*, *WWRE*, and *GNX*. Transaction standards focus on the technological aspects of inter-marketplace connectivity and interoperability. Common transaction standards would facilitate the exchange of transactions and related information. An example of cooperation in the development of inter-marketplace connectivity involves the platforms *Transora* and *Foodtrader*. Beyond the dual cooperation efforts, *Transora* aims at becoming a central platform providing linkages to others.

### *Gaining Support by Major Market Participants*

Support by major market participants who represent leaders in their field of operation may be considered as an essential development strategy for platforms. Support could involve engagement in platform use or in platform organization. Examples include:

- the platforms *Transora* and *CPGmarket* that were initiated by Consumer Packaged Goods and major agri-food companies including Kellogg's, General Mills, Kraft Foods, Bestfoods, Campbell, Nestlé, and Danone,
- the retailer platforms *WWRE* and *GNX* with companies like Auchan, Tesco, Safeway, or Carrefour as founding members,
- *Agribuys*, the platform for perishable goods, that has gained support from retailers such as Ahold or Giant, who use them for the purchase of fruits, vegetables, meat, and dairy products, and
- *Amphire*, a platform for the food service industry that gained support from food service suppliers such as Heinz, General Mills, Campbell Foodservice, Chicago Meat Authority, McCain, or the poultry producer Perdue.

### *Improvement of Trading Functionalities*

The early mover platform initiatives commonly started with rather basic trading support functionalities. These functionalities have successively been improved, extended, personalized, and automated over time to further adapt to customer requirements and customer process routines. As examples, *Agribuys* has introduced

sophisticated negotiation tools for 'Requests for Quote (RFQ)', *Amphire* and *Foodtrader* offer individualized shop environments for vendors' catalogues, *Dairy.com* actively matches 'Requests for Quotes' with offers that reflect actual spot market characteristics for dairy commodities.

### *Expansion of Value-added Services*

A core development strategy in the expansion and improvement of value added services deals with improvements in process efficiency through logistics support and customer system integration. Other value-added services involve features for 'Collaborative Planning, Forecasting and Replenishment (CPFR)', business relationship management, e-learning support or the provision of focused and individualized management support systems. *Ordersmart*, a platform that sustains trade activities between restaurants and suppliers in the San Francisco area offers individualized management support through service systems for all major elements of the restaurants' management processes, including inventory management, accounting, or recipe calculations.

Other distinguished but less frequently utilized lines of development (secondary development lines) focus on the establishment of partnerships with providers of platform technology, international expansion, or improvements in sector competence. It is especially the large platforms such as *Transora* that have partnerships with providers of technology like, e.g., Ariba, Oracle, or Sun. The expansion of services into the international community has been a focus development of platforms like *Foodtrader*, *Agribuys*, *WWRE*, *GNX*, and *Transora*. Initiatives to improve sector competence may involve a focused employment initiative regarding food industry professionals as known for the industry independent platforms *Foodtrader* or *Agribuys*.

## **Platform Development and Consequences for Sector Organization**

### *Baseline Approach*

Electronic trade platforms are often related to a possible impact on the market structure (e.g. Wigand, Benjamin, 1995, Giaglis, Klein, O'Keefe, 1999). This paragraph takes the perspective on the agri-food sector and aims at analyzing the potential impact of evolving trade platforms on the sector's organization. The discussion of implications of electronic trade platforms for the agri-food sector's organization builds on

- the platform development strategies (section 4) and
- emerging agri-food platform models.

The development strategies show principal platform evolvments during the 2000 / 2002 period and allow for projections on future development directions of platforms

in the agri-food sector. The analysis of emerging platform models allows for taking into account the actual structure of the agri-food trade platform landscape. The platform models “Neutral verticals”, “Downstream re-intermediaries”, “Ag output subsectorials”, and “Large consortia” are specific occurrences of distinguished criteria combinations and are derived from a cluster analysis using the framework

**Table 4: Emerging Platform Models and Strategic Advantages**

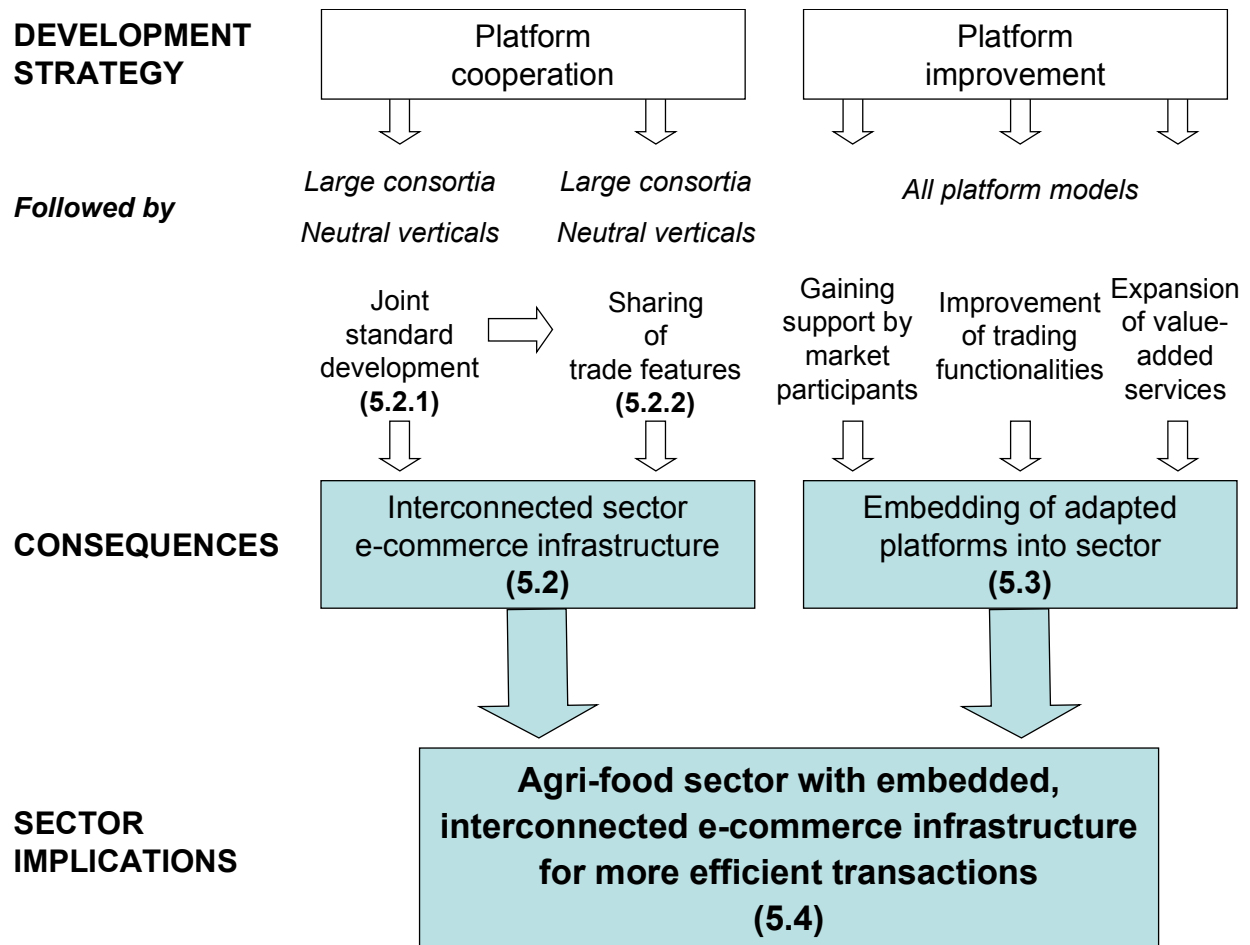
| <b>Platform models</b><br>(Fritz, Hausen, Schiefer 2003) | <b>Characteristics</b><br>(Fritz, Hausen, Schiefer 2003)   | <b>Strategic advantages</b>  |
|--|--|--|
| <b>“Neutral verticals”</b>                               | <ul style="list-style-type: none"> <li>• <i>Neutral ownership</i></li> <li>• <i>Along whole chain</i></li> <li>• <i>Worldwide</i></li> <li>• <i>Cooperation with other ETS</i></li> <li>• <i>Seller/buyer n:m (n&gt;&gt;m;n&lt;&lt;m)</i></li> <li>• <i>Transaction support</i></li> <li>• <i>Static coordination Mechanism</i></li> <li>• <i>Mixed coordination Mechanism</i></li> <li>• <i>Fee for transaction</i></li> </ul>          | <ul style="list-style-type: none"> <li>• <i>Market maker in spot markets (neutrality generates trust; see Bailey, Bakos 1997)</i></li> <li>• <i>Market organization and coordination</i></li> <li>• <i>Aggregation and bundling</i></li> </ul>   |
| <b>“Downstream re-intermediaries”</b>                    | <ul style="list-style-type: none"> <li>• <i>Fee time-based</i></li> <li>• <i>Single market participant</i></li> <li>• <i>Agri-food products in general</i></li> <li>• <i>Stage specific</i></li> <li>• <i>Bottom-up</i></li> <li>• <i>Seller/buyer n:m (n&gt;&gt;m; n&lt;&lt;m)</i></li> <li>• <i>Static coordination mechanism</i></li> </ul>   | <ul style="list-style-type: none"> <li>• <i>Combination of market expertise and existing business relationships with efficiency potential of electronic commerce</i></li> </ul>  |
| <b>“Ag output subsectorials”</b>                         | <ul style="list-style-type: none"> <li>• <i>Specific products only</i></li> <li>• <i>Fee for transaction</i></li> <li>• <i>Stage specific</i></li> <li>• <i>Mixed coordination mechanism</i></li> </ul>  | <ul style="list-style-type: none"> <li>• <i>Specialization</i></li> </ul>  |
| <b>“Large consortia”</b>                                 | <ul style="list-style-type: none"> <li>• <i>Non-food products</i></li> <li>• <i>Consortium</i></li> <li>• <i>Supply chain management</i></li> <li>• <i>Agri-food products in general</i></li> <li>• <i>Bottom-up</i></li> <li>• <i>Cooperation with other ETS</i></li> <li>• <i>Seller/buyer n:m (n&gt;&gt;m; n&lt;&lt;m)</i></li> <li>• <i>Dynamic coordination mechanism</i></li> <li>• <i>Mixed coordination mechanism</i></li> </ul> | <ul style="list-style-type: none"> <li>• <i>Efficiency advantages due to joint technology development (outsourcing)</i></li> <li>• <i>Critical mass of platform participants to be reached more quickly</i></li> <li>• <i>Market power as supported by group of existing industry players</i></li> <li>• <i>Acts according to members’ interests</i></li> <li>• <i>Elimination of competitors</i></li> <li>• <i>Strengthens members compared to non-members</i></li> <li>• <i>Combination of market expertise and existing business relationships with efficiency potential of electronic commerce</i></li> <li>• <i>Example from other industries: Covisint (consortium platform, car manufacturers)</i></li> </ul> |

presented in section 2 (Fritz, Hausen, Schiefer 2003). Table 4 shows the models with their respective criteria combination in order of importance for the respective model and discusses strategic advantages that may be associated with each model.

A combined consideration of development strategies and platform models implementing the different development strategies gives insights into the way platforms interact with the agri-food sector and allows for an estimation and projection of middle-term implications for the sector's organization.

The platform development strategies (section 4) may be classified in two principal groups (see fig. 4),

- platform cooperation initiatives and
- platform improvement initiatives.



**Figure 4:** Implications from Trade Platforms on Agri-food Sector Organization

### *Consequences from Platform Cooperation Initiatives*

Electronic trade platforms in the agri-food enter cooperation initiatives with other agri-food platforms to

- jointly develop standards and to
- share trading features,

which are both prerequisites for platform interoperability (see section 4). In principle, cooperation initiatives between platforms represent strategic alliances. Strategic alliances generally serve for providing advantages and efficiency benefits to participating organizations and focus, e.g., on joint research and development activities or know-how transfer and result in cost and time advantages and decreased competition between allied companies (e.g., Devlin, Bleakley, 1988).

### *Cooperation Initiatives for the Joint Development of Standards*

Cooperation initiatives between agri-food platforms for the *joint development of standards* focus on

- common product description standards and
- transaction technology rules

and may be considered as strategic alliances between platforms contributing to achieving an agreement on common standards.

### **Cooperations for the Joint Development of Product Description Standards**

Cooperation initiatives for the development of product description standards are strategic alliances among platforms belonging to the “Large consortia” model. “Large consortia” platforms are backed by important and powerful agri-food industry players and represent in themselves strategic alliances for the joint and therefore more efficient development of e-commerce infrastructures. Cooperations among “Large consortia” platforms for the development of product description standards may be seen as “twofold strategic alliances” between agri-food players with platforms as mediators, which put the development of sector-wide product description standards on a broad basis. This broad basis allows for the acceptance and implementation of product description standards in the agri-food sector. As a consequence, the enforcement of product description standards may be anticipated for the entire agri-food sector and may even be independent from the actual use of electronic trade platforms. Product description standards reduce transaction costs and therefore may impact the sector’s organization. In principle, this situation of standard development and introduction, which is initiated and backed by important industry players, is similar to the development and introduction of former EDI standards that followed the principle market power permits standard enforcement (e.g., Webster, 1995).

## Cooperations for the Joint Development of Transaction Standards

Cooperation initiatives for the joint development of transaction standards are strategic alliances between “Large consortia” platforms and specialized “Neutral verticals”. Transaction standards allow for transaction transmission across different platforms and prepare an interconnected platform network between “Large consortia” and the specialized “Neutral verticals” that would allow for mapping specific food supply chains. As “Large consortia” platforms are backed by important agri-food industry players (see above), enforcement of transaction standards in the agri-food e-commerce infrastructure may be expected.

Both product description and transaction technology standards have a preparative character for an interconnected platform network and an interoperable agri-food e-commerce infrastructure. The strategic alliances put the standard development on a broad basis in the agri-food sector. As a consequence, enforcement and implementation of the standards in the agri-food sector and the e-commerce infrastructure may be expected.

### *Cooperation Initiatives for the Sharing of Trade Features*

Cooperation initiatives for the *sharing of trade features* are strategic alliances between “Large consortia” and “Neutral verticals” to combine strategic advantages of different platform models. They serve for the joint use of platform features, the sharing of development efforts and know-how transfer. Advantages for “Large consortia” platforms lie in the outsourcing of development efforts for specialized trade mechanisms and result in time and cost advantages. The provision of adapted trade mechanisms to consortia member companies may be seen as prerequisite for platform utilization. The advantage for “Neutral verticals” lies in the increased number of platform participants. The value a platform provides for participants enlarges with the number of participants and has been discussed as network effect (Shapiro, Varian 2000; Kaplan, Sawhney 2000). Both specialized trading features and an increased number of platform participants add to the benefit platforms provide to companies. Platforms providing increased benefit in turn attract companies and activate platform utilization.

### *Result: Interconnected Sector E-commerce Infrastructure*

In essence, platform cooperation initiatives for the joint development of standards backed by the industry and the sharing of trade features driven by efficiency benefits may result in an interconnected, value-added and comprehensive agri-food sector e-commerce infrastructure and an agri-food sector with standardized product descriptions. At present, cooperation initiatives for the sharing of features merely occur between “Large consortia” and “Neutral verticals”. However, emerging standards for product description and transaction technology open the platform



infrastructure net for all platforms as standards are the connecting element for transaction transmission.

### *Consequences from Platform Improvement Initiatives*

Initiatives for the improvement of platforms concern the areas

- gaining support by major market participants, the
- improvement of trading functionalities, and the
- expansion of value-added services.

All these initiatives focus on adjusting and tailoring the platforms to the requirements of the agri-food sector and its companies. Gaining support by major market participants enlarges the platform user group and adds to the platform value (see above). Improving and adapting trade mechanisms and expanding value added services according to sector requirements are prerequisites for the utilization of platforms by agri-food companies. As all platform models follow these platform improvement initiatives, these initiatives may be considered as basic platform development approaches and evolution strategies. The improvement initiatives are also pursued by “Large consortia” platforms. As they realize their members’ interests, the exact tailoring of platform technology and features to agri-food companies’ requirements resulting in an increased utilization of platform services is even more likely.

A large number of participants on a platform as well as adapted trading features and value-added services are prerequisites for the integration of platforms into the agri-food sector. Consequently, platform improvement activities in these areas may activate an embedding of tailored and adapted platforms into the sector. The fact that “Large consortia” platforms standing for e-commerce initiatives of important agri-food players follow these initiatives contributes that an intensified use of the adapted platform infrastructure by agri-food industry players may be anticipated. They in turn attract potential business partners to the platforms what enlarges the integration of e-commerce in the entire agri-food sector.

### *Implications for Agri-food Sector Organization*

Platform cooperation initiatives direct towards the emergence of an interconnected e-commerce infrastructure or mega-hub. Platform improvement initiatives point towards an integration of tailored trade platforms into the agri-food sector. Both groups of development strategies will lead to an agri-food sector with an embedded and integrated e-commerce infrastructure. This infrastructure will be a platform network or mega-hub allowing for transaction transmissions across the interwoven platform network (see fig. 4). As the platform network is backed by important and powerful agri-food players, it will emerge as an integral infrastructure element of the sector.

Current development tendencies rather point to a support of existing organizational structures than to the disintermediation of existing value chain elements or a shortening of the value chain. This observation sustains that, e.g., due to their value-added services traders in the food supply chains may not be easily replaceable (e.g., Mueller, 2003).

An adapted e-commerce mega-hub allowing for transaction transmission will penetrate the agri-food sector and may lead to more efficient transactions (Hausen, Schiefer 2003). The mega-hub may be seen as interorganizational information system (see, e.g., Alter, 2002) for the agri-food sector allowing for the emergence of ad hoc supply chains. The networked trade platforms enable an increasingly networked sector with a new appearance. Middle-term development tendencies in sector organization such as networked ad hoc supply chains become apparent. The value-added service CPFR, e.g., increases vertical cooperation between agri-food chain members and directs towards a network of agri-food value chains. As a consequence, the platform net may be considered as „driving force“ and enabler for a more and more vertically and horizontally cooperating agri-food sector.

## **Conclusions**

Electronic trade platforms for the support of food trading transactions have entered the agri-food sector only a few years ago. However, there already have been dramatic changes in the sector's platform infrastructures. Of the 85 platforms monitored in the year 2000 only 25 remained active in 2002. But there are still market entries of new platforms and existing platforms form various types of partnerships.

The analysis could identify a range of development strategies of successful platforms. Cooperation initiatives with other platforms for the use of specific features and the development and use of standards, gaining support by major market participants, the improvement of trading functionalities and the expansion of value-added services are the primary lines of trade platform development and evolution.

Platform evolutions and the present occurrence of the trade platform infrastructure allow for projecting an agri-food sector with embedded, interconnected e-commerce infrastructure or mega-hub leading to a more networked agri-food industry.

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