Dairy value chain management in Bulgaria

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Abstract. *The dairy sector is among the most fundamentally affected by post-communist transition and EU integration of Bulgaria. This paper presents the dairy chain management in the country at current present stage of development. First, it analyses the state and forms of dairy value chain management identifying the dominant and prospective models of dairy chain management. Second, it outlines the features, factors and efficiency of a new business model of dairy farms inclusion in supply chain.*

Key words: value chain management; market, private and public governance; dairy sector; Bulgaria

1. Introduction

The issues related to food chain management are among the most topical in political, business and academic debates around the world (Csaki *et al*.; Glauben *et al*.; Eastham *et al*. ; Regoverning Markets). They are especially important for countries in transition and development where a great portion of farms are not included in modern market chains. With a very new exceptions there are no studies of values chain management in Bulgaria (Bachev and Manolov; Bachev 2011). That is particularly true for dairy sector which is among the most fundamentally affected by post-communist transition and EU integration of the country.

This paper presents the dairy chain management in Bulgaria at current present stage of development. First, it analyses the state and forms of dairy value chain management in the country. After that, it outlines the features, factors and efficiency of a new business model of dairy farms inclusion in supply chain.

## 2. The state and forms of dairy value chain management

Dairy sector has experienced a dramatic evolution during post-communist transition and EU integration (Bachev and Manolov). There has been carried out a fundamental

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transformation of the dairy chain though privatization and restructuring of farms and processing companies, liberalization of markets and modernization of trade chains, and unprecedented institutional modernizations (new public support and regulations etc.).

All that has brought about a significant decline in number of most dairy livestock and the milk output (Figure 1). A major part of milk production has been carried out in a numerous holdings[2], most of them being with small-scale and "semi-market" character. In the past several years there has been a considerable reduction in number and an increase in size of dairy farms (Table 1). Despite augmentation of milk share entering the value chain its portion is still significant - a good fraction of overall output is home consumed or distributed through informal channels (given to friends and relatives, exchanged, or sold to individuals) (Figure 2).

Figure 1. Evolution of dairy sector in Bulgaria
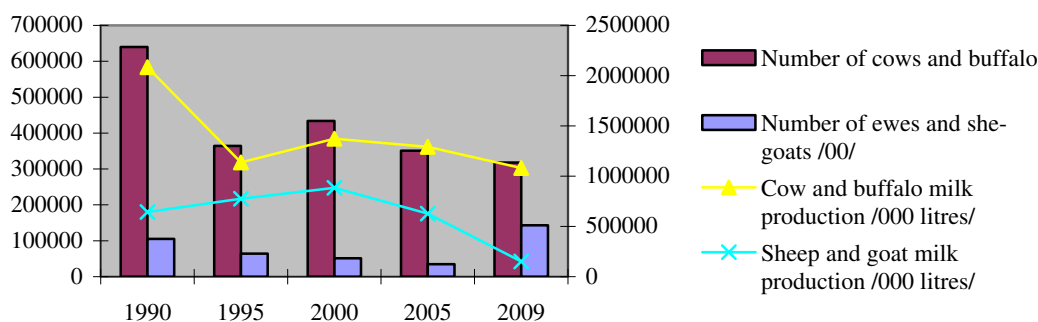

Source: National Statistical Institute

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[2] According to the last Census there are around 193700 holdings with dairy cows, 232900 with ewes, 262000 with she-goats, and 2000 with dairy buffalo (Agricultural Census).

Table 1. Evolution of dairy farms in Bulgaria

Type of holdings	Year	Share farms	Share heads	Share farms	Share heads	Share farms	Share heads	Share farms	Share heads	Average heads
		1 -2		*3 - 9*		*10 - 19*		*20 and >*		
Cows	2003	87,3	56,3	11	23,3	1,1	6,9	0,6	13,5	1,9
	2006	80,1	40,1	15,3	26,4	2,5	12,8	1,1	20,7	2,5
	2009	79,6	30,1	14,6	20,0	3,3	13,6	2,3	36,3	3,3
Buffalo cows	2003	85,3	47,5	11,4	20,6	1,6	8,9	1,2	23	2,3
	2006	74,4	24,3	17,5	18,7	5,5	18	2,3	38,9	3,8
	2009	63,5	11,4	21,6	11,5	7,9	16,4	6,9	60,7	7,3
		1 - 9		*10 -49*		*50 -99*		*100 and >*		
Ewes	2003	56,7	89,3	26	9,6	7,8	0,7	9,5	0,4	5,9
	2006	85	39,6	12,5	27,9	1,6	13,1	0,8	19,3	8,1
	2009	29,8	82,8	22,6	13,2	14,4	2,2	33,2	1,7	10
She-goats	2003	98,2	86,8	1,2	5,8	0,4	4,4	0,1	3	2,6
	2006	97,3	79,2	2,5	16,7	0,1	2,9	0,02	1,1	2,7
	2009	96,2	67,3	3,3	20,2	0,3	7,6	0,01	5	3,1

Source: Ministry of Agriculture and Food

Figure 2. Milk according to type of utilization in Bulgaria
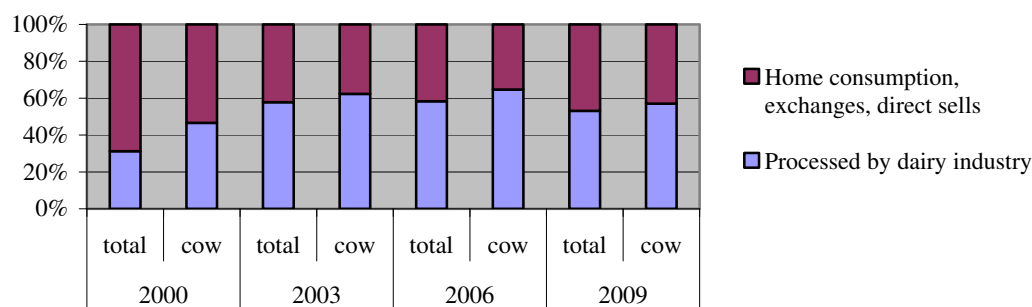
Source: Ministry of Agriculture and Food

As a result of the failure to adapt to new market and institutional requirements (market competition; new EU, national, processing industries, and consumers requirements for quality, quantity, safety, traceability, animal welfare, environment protection), the majority of dairy farms and the bulk of the output are not included in the modern market chain. The later has been further impeded by the lack of effective public support to dairy sector and forms for group production, marketing and processing (Bachev 2010). Consequently, smalls-scale operations with primitive technology and hygiene, environmental and animal welfare standards, and low income and market opportunities, have been typical in the sector.

There has been a fundamental modernization and consolidation of dairy processing industry as well. The later has been driven by strong market competition (at international and local markets), consumer, food chain and export demands (for quality, product

differentiation, time of delivery, packaging etc.), and newly introduced EU and national quality and safety standards. Consequently, the number of dairy processors declined significantly since 2000 - from 840 to 274 currently (MAF).

There have emerged a number of effective forms for governance of individual (raw milk production, collection, transportation and processing, storage and packaging, and trade of final dairy products) stages of dairy value chain in the country (Figure 3).

Figure 3. Principle forms of governance in dairy value chain in Bulgaria

Value chain stages	Modes of governance			
	market	contract	private	public
Milk production	Import of Powder milk	na	Unregistered holdings, Cooperatives, Agri-firms, Integration by processor or (restaurant, recreation etc businesses	Quality, safety, eco etc. regulations and standards; Public support for adaptation; Public subsidies to producers
Raw milk collection	Middlemen	Delivery contracts with processors, Interlinked contract for milk supply against final dairy products	Group collection, Backward integration by processor	Quality, safety, eco etc. regulations; Public support to producers organizations
Raw transportation	na	na	Integration by middlemen or processor	Quality, safety, eco etc. regulations
Milk processing	na	Processing contract	Group processing, Cooperative, Firm, Corporation	Quality, safety, eco etc. regulations and standards; Public support for modernization
Storage and packaging		Contract with warehouse	Processor, Food shop, Retail chain	Quality, safety, eco etc. regulations and standards
Dairy trade	Retail marketing, Wholesale, Export	Delivery contracts with shops, food chains, wholesale traders; Interlinked contracts with milk suppliers; Delivery contracts with cooperative members	Direct marketing of dairy products, Interlinked Marketing with services	Quality, safety, eco etc. regulations and standards

We have identified several formal models for dairy chain management in Bulgaria[3].

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[3] In addition, there have been widespread informal (illegitimate) modes with little significance for value chain such as "home" or "contract" processing, "street" marketing, clientalisation etc.

Model 1: Integration of dairy producers by a processor

Integration of raw milk supply by an industrial processor is the most common modes for dairy chain management in the country. Almost all commercial dairy processing is done by different type of business organizations – few large corporations and numerous limited liability (one person or partnership) firms[4].

Market integration of numerous dairy farmers has been initiated by a dairy processor specialized in processing of locally produced milk. Despite the number of alternative buyers of raw milk in all major regions, a close quasi and/or complete integration of different stages of value chain often develops (Figure 4).

Figure 4. Typical dairy value chain in Bulgaria
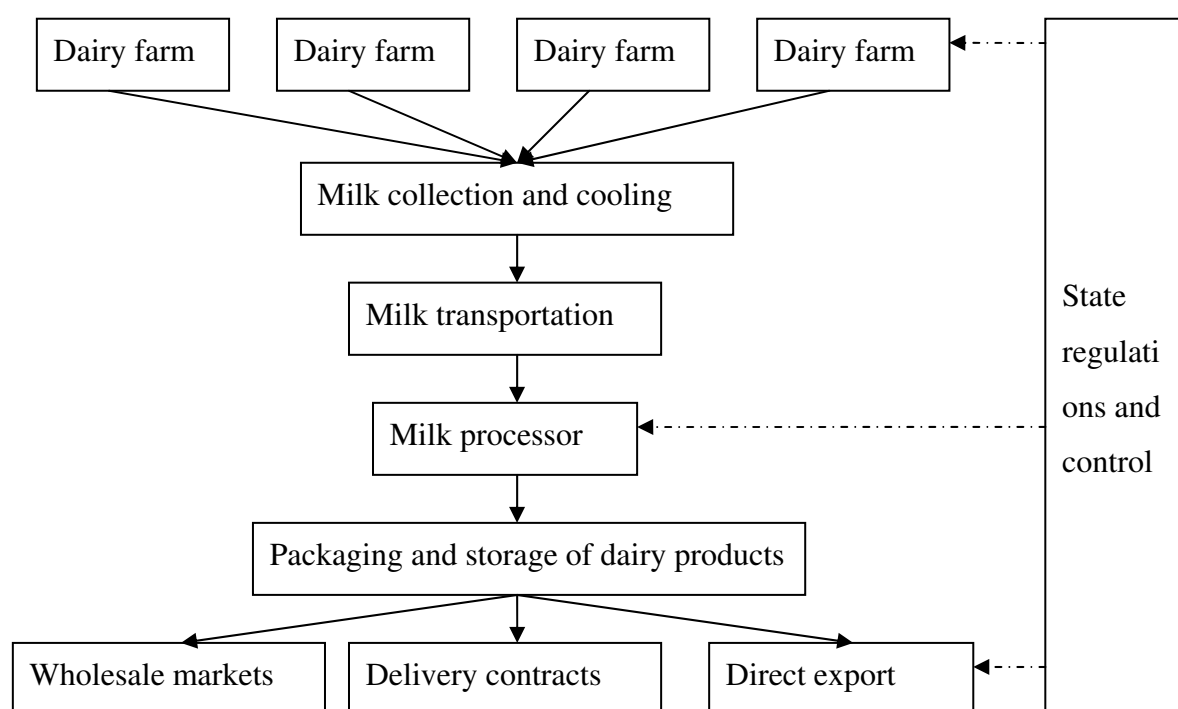
Backward, the high quality, assets, capacity, product specificity, cite, time of delivery etc. dependency between farmers and processors is commonly governed by tight long-term and interlinked contracts. For instance, interlinking the inputs, working capital, service etc. supply by the processor against the milk marketing by dairy farmers is widespread. Furthermore, the processor sets up an own (private) quality and safety control system from on farm milk collection, through transportation and processing, to wholesale delivery of

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[4] Presently, there are around 30 large corporations, and around 240 firms of different type and size processing milk in Bulgaria (MAF).

processed dairy products. Stages of collection and cooling of raw milk of small farmers, milk transportation from farms to the processing company, packaging and storage of processed products, all are typically integrated by the processor. The role of the state is to set up process, quality and safety standards, license dairy processors, and exercise control on final (consumers) products.
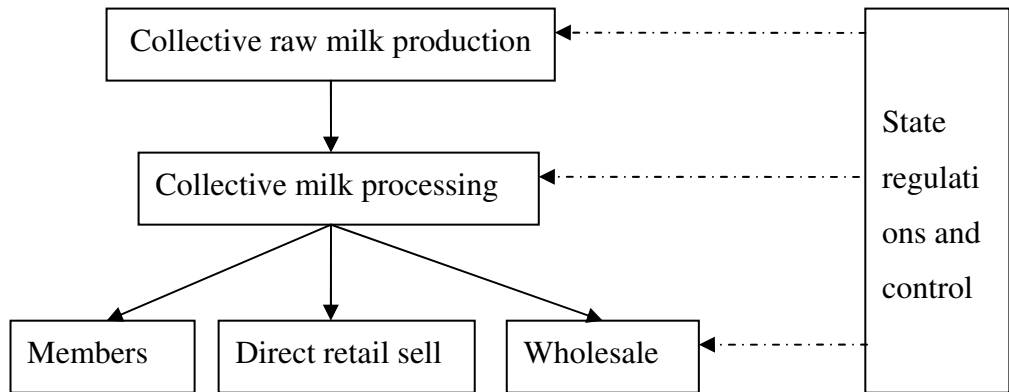
Downward, the value chain often expands at regional, nationwide and even international scale. For examples, delivery contracts specifying timing, quantity, products differentiation, packaging requirements etc. with specialized shops, large retailers, restaurants as well as brand name trade are broadly used. All that development is associated with increased efficiency, commercialization, and income level of participating in value chain dairy farms (Bachev and Manolov).

Model 2: Collective production and/or processing

There are 247 production cooperatives with cows, 95 with ewes and 7 with she-goats rearing a small portion of all livestock in the country. In the 1990s almost entire livestock production was transferred into individual (unregistered, firm) holdings due to inefficiency of collective organization (Bachev 2010). Produced milk is mostly to meet members' needs but part of it is also marketed through delivery contracts with processors.

In 1990 most cooperative dairy processing ceased to exist due to competition with private industry and/or impossibility to meet tough institutional requirements for quality, safety etc. Currently, there are only 6 cooperatives processing insignificant amount of milk. Final output goes to serve members needs, directly marketed to local communities, or sell out to market agents (middleman, shop, restaurant, hotel etc.) (Figure 5). Despite efforts of producers organizations there have emerged no forms for collective collection and/or processing of milk output of small-scale dairy holdings.
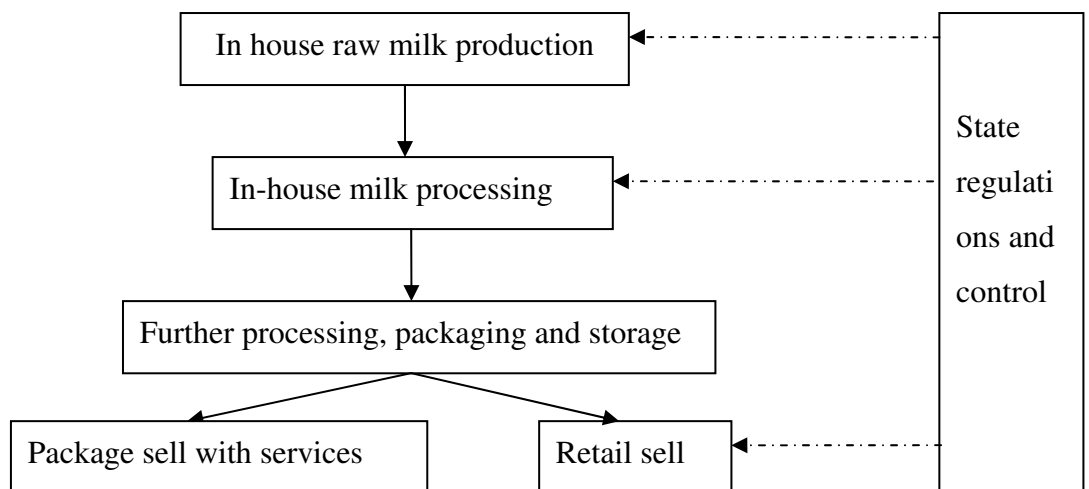
Figure 5. Collective dairy production and processing chain

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┌─────────────────────────────────┐          ┌──────────────┐
│ Collective raw milk production  │◄·········│              │
└─────────────────────────────────┘          │    State     │
                  │                           │   regulati   │
                  ▼                           │   ons and    │
┌─────────────────────────────────┐◄·········│   control    │
│   Collective milk processing    │          │              │
└─────────────────────────────────┘          │              │
        │         │         │                │              │
        ▼         ▼         ▼                │              │
   ┌────────┐ ┌──────────┐ ┌──────────┐◄·····│              │
   │Members │ │Direct    │ │Wholesale │      │              │
   │        │ │retail sell│ │         │      │              │
   └────────┘ └──────────┘ └──────────┘      └──────────────┘
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Model 3: Complete integration of production and processing by a processor or a service provider

There are few examples of complete (backward) integration of raw milk production by a processor. Often that is coupled with complete foreword integration into retail trade (own shop) or ("package sell" with) related services such as tourisms, restaurants, eco-system services etc. This mode guarantees effective supply of necessary raw material in needed quantity, quality, price and origin, and let expropriation of entire value chain profit (Figure 6).

Figure 6. Complete integration of production and processing by a single agent

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┌─────────────────────────────────┐          ┌──────────────┐
│   In house raw milk production  │◄·········│              │
└─────────────────────────────────┘          │    State     │
                  │                           │   regulati   │
                  ▼                           │   ons and    │
┌─────────────────────────────────┐◄·········│   control    │
│    In-house milk processing     │          │              │
└─────────────────────────────────┘          │              │
                  │                           │              │
                  ▼                           │              │
┌─────────────────────────────────────┐      │              │
│Further processing, packaging and     │      │              │
│storage                               │      │              │
└─────────────────────────────────────┘      │              │
        │                    │               │              │
        ▼                    ▼               │              │
┌──────────────────┐  ┌──────────┐◄··········│              │
│Package sell with │  │Retail sell│          │              │
│services          │  │           │          └──────────────┘
└──────────────────┘  └──────────┘
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Expansion (market orientation) of this form is severely restricted by inefficiency of integral management of quite specific specialized activities (farming and processing), and impossibility to enlarge dairy farming to explore economies of scale/scope or capacity

dependency. Subsequently, the integrator either specializes in dairy processing (needs to buy from multiples suppliers) or concentrates on services interlinking marketing of highly specific (branded, original) and limited dairy products.

Model 4. Integration of dairy chain by a special agent

A newly evolving and perspective model of dairy chain management is carried by a special agent (investor, trader, brand-name holder etc.). For instance, there are still few organic livestock farms and only three organic processors for dairy products in the country. Thus, there is a condition of small number of local supplies and buyers for organic livestock products, and a strong symmetrical (capacity, assets, technology) dependencies in vertical chain of organic dairy. What is more, most of the organic (dairy etc.) products are exported to other countries since the local and national markets for organic products are very small[5].

The organic production and processing is associated with significant specific investments (for conversion, certification, carrying out production and marketing) and a highly specific character of the output. All that requires a tighter coordination of individual stages in vertical chain in national and transnational scales[6]. Consequently, the typical value chain of organic dairy includes effective governance carried out by a local (processor, exporter) and/or an international (entrepreneur, wholesale buyer) agent.

In one case, a foreign agent (an importer of Bulgarian organic products) arranges the independent certification of local organic production and finances the certification costs (unbearable by local small operators) (Bachev 2011). In other case, a leading restaurant chain intends to integrate backward organic dairy farming and processing in order to secure the effective supply of needed local organic products (Bachev 2009).

Furthermore, a deeper contract or compete integration of individual stages of value chain develops – namely between the organic crop (production of feed for animals) and livestock farming, between the dairy farming and processing as well as between the milk-processing and marketing of final dairy products (Figure 7).

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[5] The later is a result of unawareness of local consumers, higher (unaffordable) prices, lack of confidence in truly organic character of available products etc. Widespread eco-labels are often seeing as part of the marketing strategies of big companies rather then an indicator for genuine eco-actions (Bachev 2009).

[6] Up to date, most of the organic agricultural production in the country has been governed by outside investors, and widely perceived as "big businesses" sub-sector.

Figure 7. Value chain for organic dairy products in Bulgaria
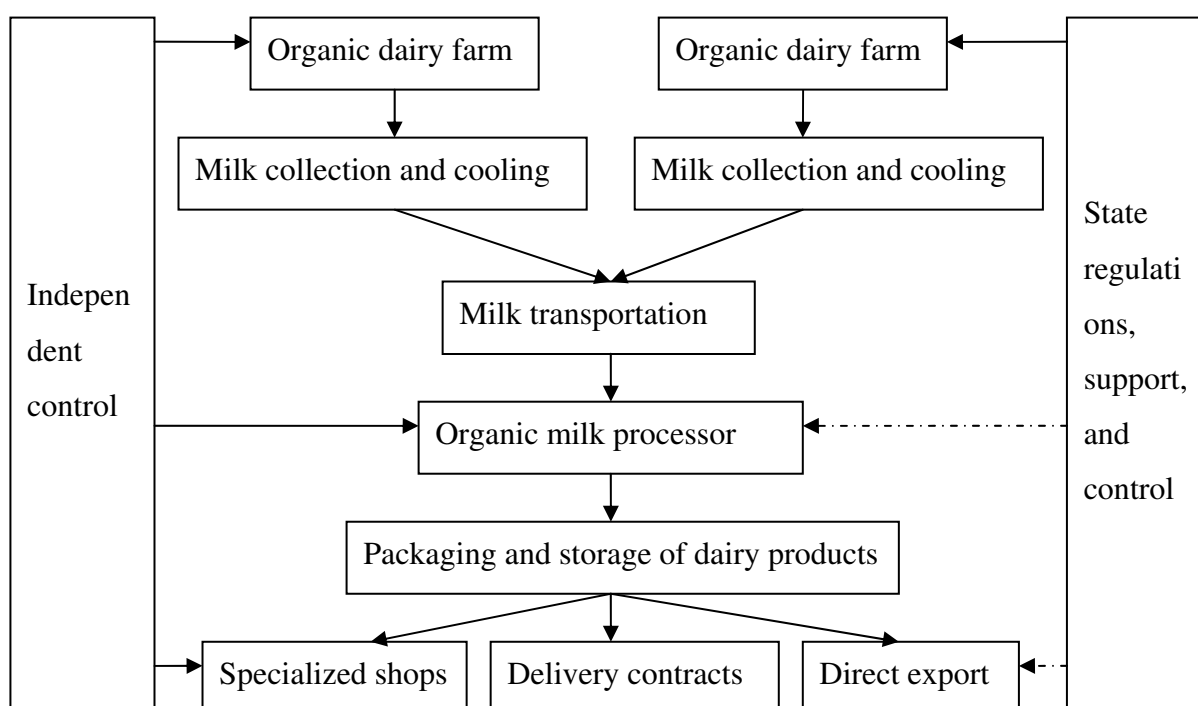
Principally, a smaller number and remoteness of the organic livestock farms requires a higher (than traditional sheep grazing) operational scale to make integration feasible (to invest and pay-back costs for organic conversion and certification; explore economies of scale and scope on production, storage, transportation, transactions etc.). For instance, our non-inclusive survey on organic sheep holdings in the country has found out that the number of animals in farms varies between 60 and 800.

In the organic value chain there is on farm integration of the feed and forage production, milk production, and milk collection and cooling stages. In downward side, there is a close (contract, interlinked, joint investment) coordination of the marketing of processed dairy products at a national and international scale.

The value chain also includes a third-party control on all stages (farming, processing, trade) carried out by an independent certified body as well as a direct public involvement in funding of superior costs of conversion to and carrying out organic farming.

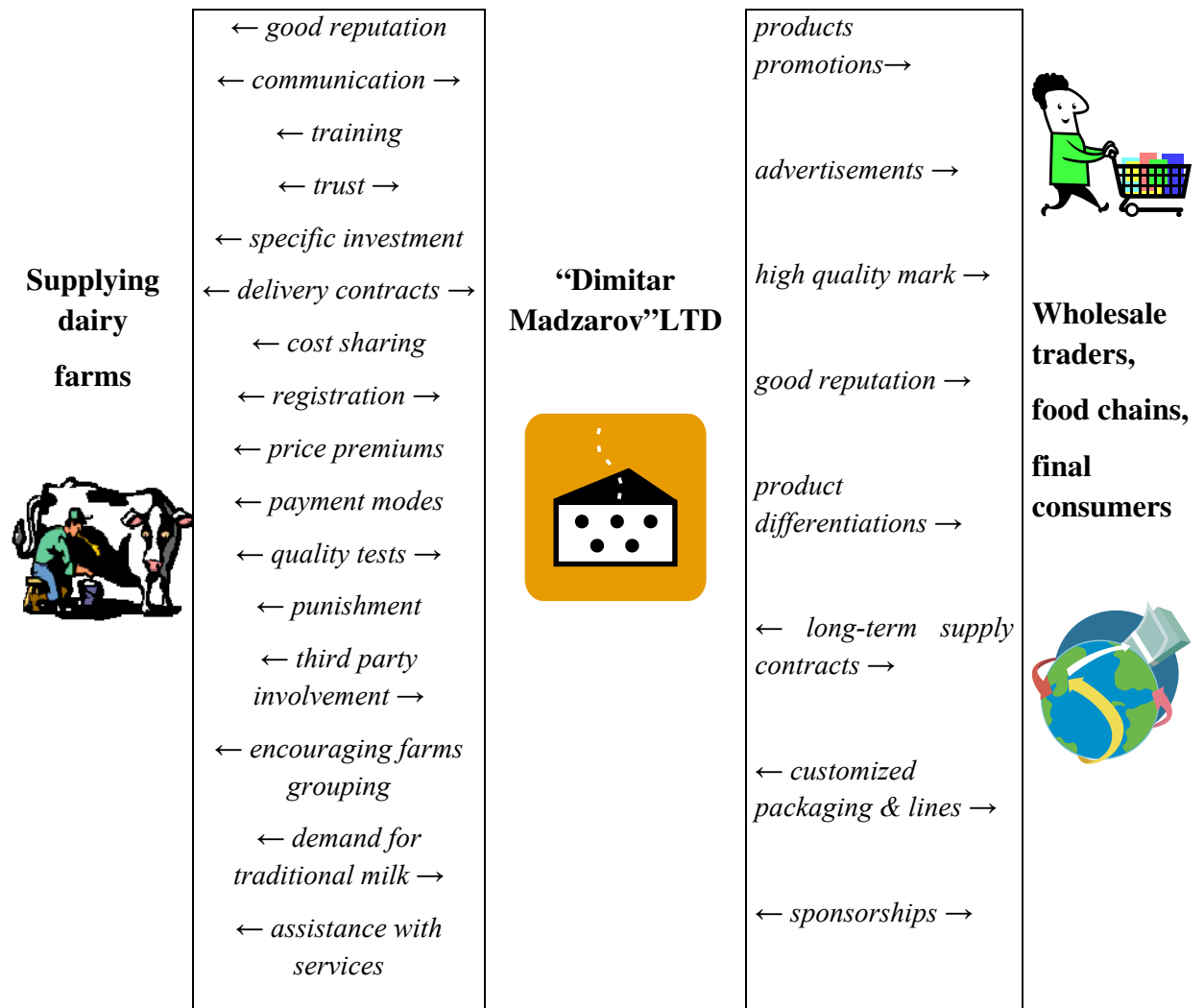**2. Case study on a new business model of dairy farms inclusion in supply chain**

A good business model for effective inclusion of numerous dairy farms has been developed by a private entrepreneur "Dimitar Madzarov" LTD from Plovdiv region, in South- central part of the country.

For last 10 years milk processing by Dairy has extended 20 folds (50t/day) involving up to 1000 livestock farms from entire region. Most suppliers are small-scale holdings a half having less than 5 cows and 40% between 5-10 cows. Milk supply, processing and storage quality has been modernized up to the top EU standards (including a modern system of quality and safety controls). A Company Mark for high quality and a great range of traditional and original products (brined cheeses, yellow cheeses, soft cheeses, processed cheeses, curds, butter, katuk etc.) have been established. Most of output (60%) is marketed to biggest food chains though long-term delivery contracts, 10% is sold on wholesale markets, and 30% exported.

I great variety of effective instruments and mechanisms for governing relations with counterparts, buyers, and final consumers have been employed (Figure 8). The later include: advertisements and product promotions (including on Plovdiv international fair), product differentiation, building a quality mark and good reputation, long-term supply contracts with big customers (national and local food chains), customized produces and packaging, sponsorships etc.

Similarly, an effective system for governing relations with individual farmers has been put in place (Figure 8). *Good reputation* for a reliable partner has been built which gives farmers sense of security and willingness to maintain bilateral trade. That is additionally enhanced by *formal delivery contracts* with each supplier. High frequency of relations facilitates transactions, develop trust, stimulate cooperation and restrict opportunism. The Dairy Manager is responsible for *communications* with farmers, and available to discuss goals and problems any time. Twice a month are held *group discussions* and *training* of farmers on new Dairy's and institutional requirements, prospective standards, problem identification and resolution, public support opportunities etc.

Figure 8. Structure of dairy chain management by "Dimitar Madzarov" LTD

Supplying dairy farms	"Dimitar Madzarov"LTD	Wholesale traders, food chains, final consumers
← good reputation ← communication → ← training ← trust → ← specific investment ← delivery contracts → ← cost sharing ← registration → ← price premiums ← payment modes ← quality tests → ← punishment ← third party involvement → ← encouraging farms grouping ← demand for traditional milk → ← assistance with services	products promotions→ advertisements → high quality mark → good reputation → product differentiations → ← long-term supply contracts → ← customized packaging & lines → ← sponsorships →	

Significant on *farm (cite)specific investment* have been made consisting of milk collecting, cooling, and controlling facilities and staff in neighbourhood to small-scale farms, and within individual or groups of farms. These highly specific to farms material assets are *provided (rented) for free* as Dairy carries *maintenance*. Existence of common and group collecting capacity nearby small farms (having little or none alternatives for milk commercialization) let them become a major supplier. *Group organization* of milk collection also increases farmers incentives for cooperation (restricting opportunism), and save costs for quality and quantity verification. All that creates possibility and/or gives strong incentives for farms to trade with that particular dairy since it makes milk marketing feasible saving considerable investment and maintenance costs. Group tanks also encourage group organization increasing common interests and mutual (self) control. Moreover, the Dairy

processes *all type* (cow, sheep, goat, and buffalo) *milks* which let keeping and extension traditional livestock productions in the region.

Efficient *system for verification* and *registration* of quality and quantity of delivered milk by each supplier is introduced guaranteeing precise quality control, traceability and avoiding conflicts with farmers. *Punishment* is applied for cheaters of milk quality (treating with antibiotics) or quantity. A *regular payment* brings about a stable income of farm households and incentives to keep relation. *Differential prices* are used to stimulate extension of livestock operations and milk supply as bigger suppliers get a premium. In winter period (deficient milk supply) *advance payment* is employed interlinking "interest-free credit" against "marketing of milk". That guarantees cash-flow for farms, secure carrying out production, and stabilize milk delivery.

The Dairy also provides *assistance* to farms *in construction* of new facilities and *preparation of projects* for public support. That is essential since small-scale farmers have no capacity to execute these operations or hire a market provider. Interlinking also facilitates trade, increases efficiency and intensifies relations, keeps smooth/increases milk production and supply

Our study has found out that involvement in trade relations with the Dairy has affected positively most farms. A great portion of them have got an increase in milk production and marketing. Comparing to the year of commencement of milk production and milk marketing average growth is 195.4% and 115.1% accordingly as most farms indicate a boost in marketed milk to the Dairy. These confirm that trade relations with the Dairy has been an important factor for commercialization of milk production in surveyed farms, a bigger commercialization comparing to the rest farms, and high efficiency (and extension) of bilateral trade (in contrast with negative tendencies in evolution of dairy farming in region and nationwide).

The main reasons for selling milk to the Dairy are reported as: "existence of contract", "collecting milk close to farm", "better quality control", "good reputation", "high trust", "timely payment", "higher prices", and "lower risk" (Figure 9). All they facilitate and intensify bilateral trade and decrease transaction costs. Close integration (communication, coordination and stimulation mechanisms) let the Dairy introduce effectively new requirements for suppliers (quality, time and mode of milk delivery) facilitating farmers' adaptation to new standards and increasing commercialization and effective inclusion in big food chain.

**Figure 9. Main reasons for selling milk to "Dimitar Madzarov" LTD**
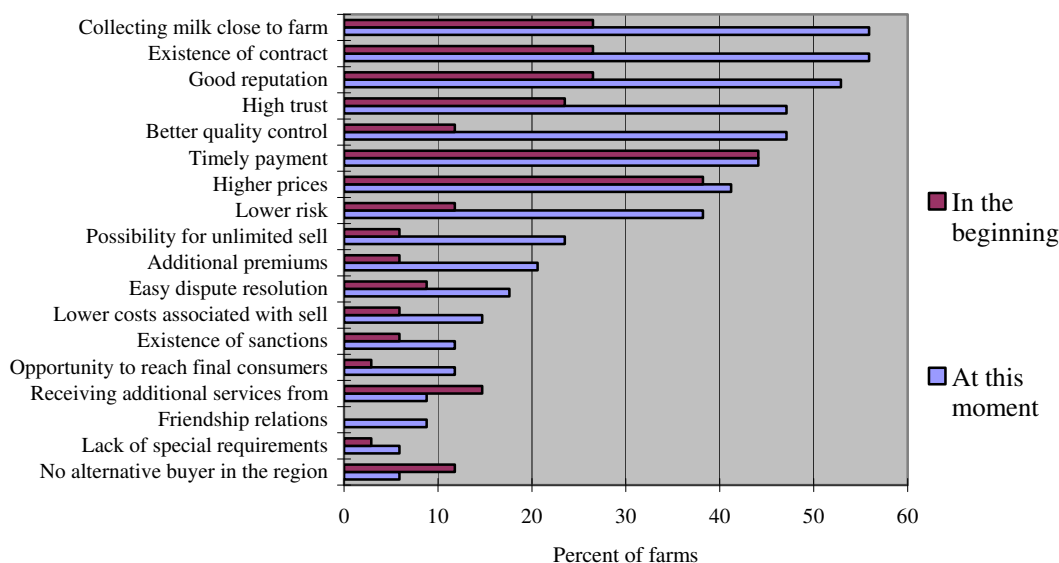
Source: Survey data

Most common changes farmers had to make to start selling milk to the Dairy were in "hygiene of production", "farm management", and "milk quality" (Figure 10). In order to carry on selling milk to the Dairy a good number of farms must improve "hygiene of production", "milk quality", "increase number of animals", "volume of production", "improve animal welfare" and "environmental care" and that is associated with additional costs, investment, and labor.

There has been a significant evolution of *contract relations* and now a written form is commonly used as long-term mode, fixing quality, quantity, pricing, sanctions are wider (than before) applied. More than before farmers negotiate (higher than market) prices, get long-term stable prices, and see sanctions (linked to milk quality, safety) included in price terms. Contract governance improves coordination, let easy adaptation to evolving market conditions, gives security for both sides, facilitates (decreases costs) of relations. The written mode allows clarity of provisions, possibility to specify more details, easy verification and control, incentives to meet negotiated terms, and facile dispute resolution (e.g. through a court system).

Figure 10.   Changes to be made to sell milk to "Dimitar Madzarov" LTD
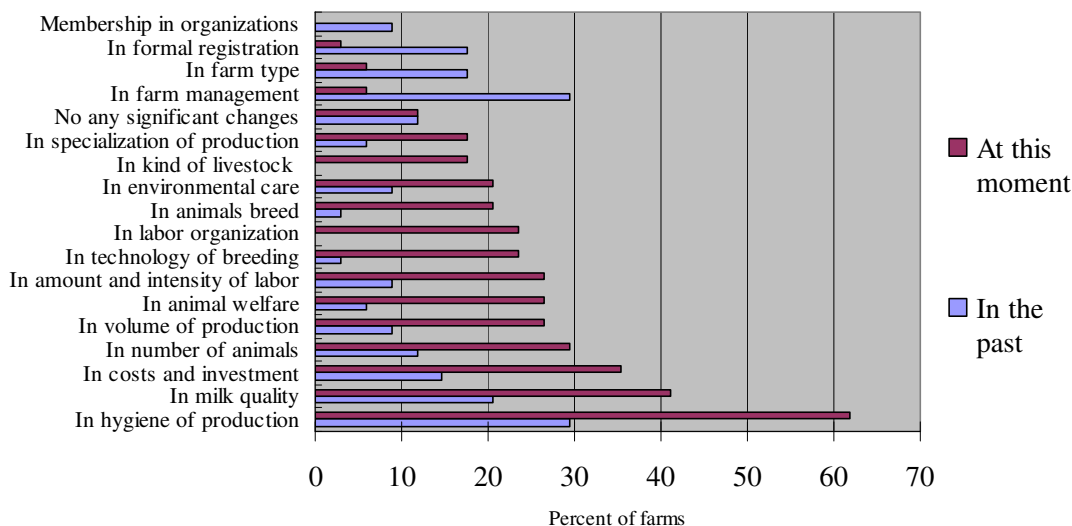
Source: Survey data

In addition to farmers experience and skills the "development of "Dimitar Madzarov"LTD" and "closer integration with the Dairy" are identified as *major factors* for the evolution of surveyed farms (Figure 11). Dairy establishment and expansion increases significantly demand for locally produced milk providing incentives for increasing production, commercialization, and quality. Integration with the Dairy has led to enlargement of the size of participated farms (having bigger number of heads than in the region). Moreover, majority of farms enjoy a higher income, better quality of production, greater stability of sells and prices, better possibility for modernization and adaptation to formal requirements, and care for animals and environment, than other farms in the region. Integration has also led to improvement of relative situation of farms – holdings feeling they are better-off now are more then it was in the past. Improvement is to be judged even higher on the background of lack of progression in dairy sector nationwide.

Figure 11.   Most significant factors for development of dairy farms
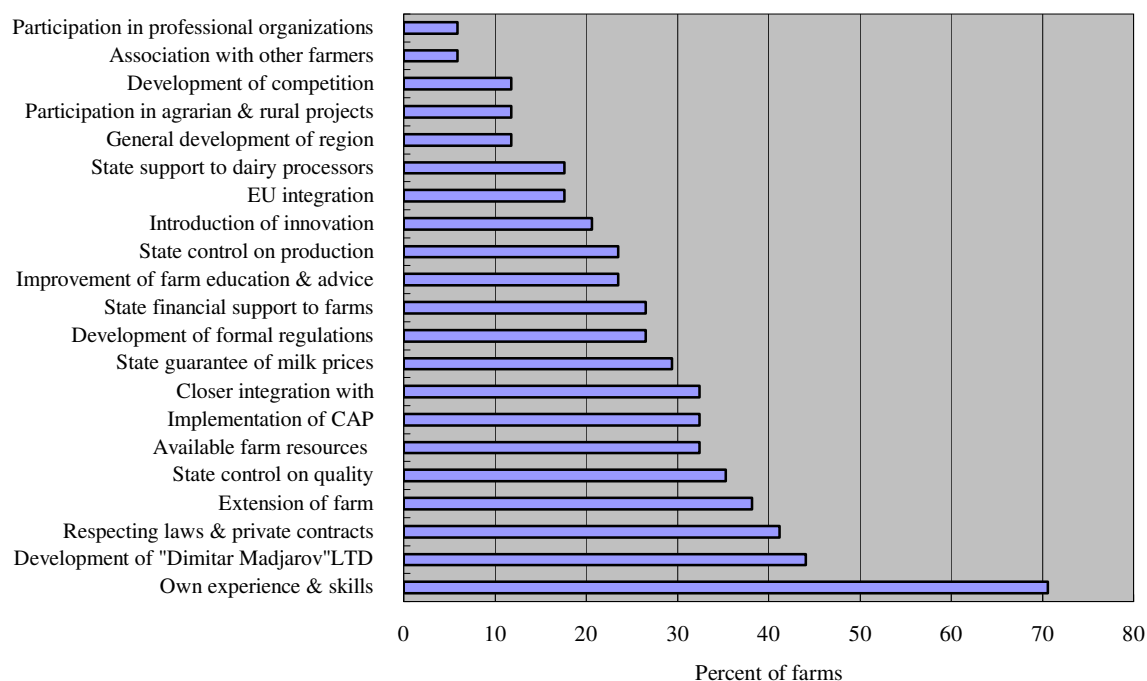
Source: Survey data

Our survey has found out that more than a half of the farms have intention to "extend activity", 30% to "keep activity unchanged", and no farm to "decrease farm size, concentrate on crop production, or change type of farm". Furthermore, a considerable number of farmers envisage a "closer integration with "Dimitar Madzarov" LTD". The Manager of the Dairy also sees a further integration with chief suppliers as a probable direction for development. All these suggest a high sustainability of studied mode of chain management and participating farms.

According to the Manager of "Dimitar Madzarov"LTD the most important factors for future development of presented model are: "own experience", "implementation of CAP and EU integration", "closer integration with suppliers", "enhancement of competition", "state control on production", "state control on quality", "state financial support to farms", "state support to processors", "extension of the Dairy", "modernization of the Dairy", "farmers training", "farms enlargement", "farmers association", "participation in bigger projects for agrarian and rural development", "general development of region", "taking part in professional associations", "improvement of formal regulations", and "respecting lows and private contracts".

For participating farmers, in addition to their own skills and the development of and integration with the Dairy, the "perfection of institutional environment" (improvement and

better enforcement of laws and private contracts, state control on quality and support to milk producers) are perceived as crucial factors for farming development. Despite its potential to resolve much of the problems (volume requirement, member orientation, economy of scale/scope on production, eco and transacting activities) participation in producers cooperative or association is planed merely by 3% and 18% of surveyed farms accordingly.

Conclusion

Positive models for dairy chain management in Bulgaria could be replicated in other transitional and developing countries with widespread semi-subsistence and small-scale farming, a lack of farmers' marketing and processing organizations, a shortage of processing enterprises (or the domination by less adaptive and innovative large state enterprises), a deficiency of public government or international support, an increasing demand for high quality local dairy products, and fundamental modernization of market, industry and institutional quality, safety, environmental etc. standards. An effective adaptation of individual modes of governance of dairy chain stages could be achieved after appropriate investigation of specific technological, economical, behavioral, institutional etc. factors of their development.

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