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Herd Modelling for Improved Management: Characterising the Pig Farmer in Information Space

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Abstract (Book of Abstracts 55, page 293)

Modern livestock herd managers work with a variety of farm objectives in face of their actual situation and future insecurities. There is the daily reality of herd, labour and income that has emerged from the past and with which they have to work. Supported by technology this daily reality is constantly progressing towards further increase of intensity and scale. The future perspective is clouded by a variety of insecure scenarios, of which some are not promising: falling prices, increased risks of disease outbreaks and/or food quality problems, conflicting interests of consumers' demands, etcetera.

Where do farmers take a stand in this turbulent environment? Field surveys have revealed that there is no single answer. Depending on the *rationale* for their current situation and their *ambition* for the future development of their farm, farmers hold a variety of positions. There are various *styles of farming*. Each style of farming represents a specific and logic of rationale and ambition, and represents specific objectives and strategies. Making use of examples in pig farming it will be discussed how to analyse styles of farming and which demands each style of farming has with regard to management information. Herd modelling for improved management should therefore relate to the specific objectives and strategies of the various styles of farming.

Introduction

Since the 1980s, there has been a growing need for new concepts related to agriculture and rural areas. Through technical developments, the unpredictability of natural conditions for agricultural production is increasingly controlled, but the economic conditions have become less predictable. At the same time, the aim of agricultural practice is shifting from a focus on productivity to sustainability and diversification of rural functions. To support this shifting focus, new strategic concepts are required at farm level, as well as in renewing agricultural policies, institutional structures and infrastructures.

Scientific studies of styles of farming have described and explained the diversity in farming practices. Scientists conducted these studies in participatory trajectories. However, they did not design the studies for strategic perspectives. I attempted to bridge the gab between science and strategy in my thesis (2003), through survey studies of styles of pig farming in reference to their techno-sociological space of information. I used field information from the eastern concentration area for pig production in The Netherlands: Twente and The Achterhoek. Currently I am doing a follow-up study in two pig production areas in France: the department Côte d'Armor in Bretagne and the departments Lot, Aveyron and Tarn in the Mid Pyrenees.

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Aim and objectives of the article

The aim of the article is to provide a way of understanding styles of pig farming in their space of information, as a support for understanding strategic options for future perspectives for pig farmers and for rural regions. The first objective of the article is to address the interests of scientists and pig farmers. Next, the objective is to clarify the notion of space of information, the various conceptual notions of styles of farming and the difference with typing farm.

The findings about styles of pig farming in an intraregional perspective in the east of The Netherlands, introduce the diversity of dominant logic of groups of pig farmers in reference to specific dimensions. Several examples from field surveys illustrate the relationship between styles of pig farming and structural features in their space of information. The protocol for the recently started survey in France is a synthesis from the study in The Netherlands. It serves to present the methodology for techno-sociological research about styles of pig farming. In the discussion, long-term market developments indicate the options for building new strategies based on understanding the diversity in dominant logic of various styles of pig farming. Herd models for management support can be adapted to styles, by the development of modules.

Interest of farmers and scientists

Farmers have interest in stable and predictable conditions for pig production and marketing. Through technical farm measures, the conditions for production are fairly under control in the pig production branch. However, the economic conditions on the pig markets and the external demands for specific modes of production are increasingly unstable, with poor perspectives for profit developments. Farmers cannot influence these external conditions directly, through technical farm measures. They depend on the adaptation of regional and chain structures in response to changing external and market conditions. In anticipation to the external changes, farmers with different styles have interests in specific and adapted farm management support.

The interest of rural and animal scientists in styles of pig farming is the improvement of their understanding of the farmers' options and perspectives, and of the various ways in which one can be a pig farmer. With such improved understanding, these scientists can contribute to the development and application of various measures (taken by the farmers themselves, as well as by their environing institutes and enterprises) to improve the sustainability and liveability of pig farming. Respecting the diversity in farmers' logic, animal scientists have specific interest for improving their interpretations of (technical and economic) farm data and management indicators. The dominant logic as found in groups of farmers and represented as styles of farming provides a specific frame of reference for the interpretations of these data. Extension technicians can use these interpretations to develop specific farm management support for various styles of pig farming.

Space of information / introduction to styles of farming

Structural features and communications dominate the space of information in which farmers operate. The most determining structures are the technical features and infrastructures. Firstly, there are techno-ecological features, like the (stable) climate, genetic material, the options for farming based on the soil type and the available physical space. Secondly, there are features of the economic infrastructures, like supply and sales markets, transport measures, investment opportunities, et cetera. Thirdly, there are institutional infrastructures, concerning farmer's unions, farmer's co-operatives, various governmental levels, institutes for research, education, extension, and management support, animal health care stations, et cetera.

These structural features can vary substantially among different regions, making interregional comparison of farm operations difficult. In extended international studies, Hayami and Ruttan (1971, 1985) showed that two basic factors determine interregional (international) variation:

Intensity [productivity per unit of source (i.c. land)] and *Scale* [amount of source (land) per unit of labour input] (See also the discussions in: Bolhuis & Van der Ploeg 1985/1988: 26ff, and Van der Ploeg 1996: 7ff).
Within the same region however, with more or less homogeneous technical structures and infrastructures, as well as in comparison studies of different regions with analogous technical structures and infrastructures, scientists found diversity in patterns of farming practices, which they could not reduce to variations in factor prices (Bolhuis & Van der Ploeg, 1985/1988: 27). Hofstee (1946) already related this diversity in patterns of farming practices that he found, to different dominances in structural communications. Neighbours, family and friends, extension technicians, researchers, teachers et cetera, all participate in the structural communications in the rural areas. In specific discourses, they cover the current topics, sensitivities and conflicts that prevail, and thus they direct the conclusions and solutions that farmers choose, apply, and copy from one another. Therefore, a space of information is not only structured in a technical sense, but also in a social sense. Farmers represent the differences in outcome of the social processes in a diversity of patterns of approaching their merits. To describe these patterns in relation to the environing space, Hofstee introduced the term *style of farming*.

Styles of farming; conceptual notions, frameworks and definitions
Styles of farming are cultural repertoires (or patterns) in farming practices. Through the years a good number of definitions are developed. In pre-industrialised farming, styles of farming were locally based cultural patterns (Hofstee 1946, 1985). After the industrialisation, the structuring principles were identified as technology and markets (Van der Ploeg 1994) or technology and *business* (Commandeur 2003: 14ff) – referring to the interdependent relation between labour and markets. The dimensions specify the structure of the *space to manoeuvre* for farmers in reference to their technical and infrastructural conditions for producing. The notion reduces the image of independent farmers, facing broad spectra of opportunities and dynamic options for decision-making, to pattern-tight farm operators, facing at the most a handful of structurally embedded options for development. One can define the concept of styles of farming from various points of view.

Modernisation progress. In studies in the context of the industrialisation and modernisation progress of farming, succession, labour division and gender, the orientation on location, and the notion of locality dominate the dimensional framework. How farmers interact with each other and with the emerging opportunities in their environment is the focus in these studies. Some scientists conduct these studies by using cross-sections in time, and focus the analysis on the changes among the various cross-sections and the key moments in time for the changed to emerge. These styles of farming reflect the vitality of farm continuity in the region. (For examples see Ventura 2001, Gerritsen 2002, Remmers 1998, Van der Broek 1998, and Bennett 1982, and on labour and gender Commandeur 2005 (in press), and Bock 2002).

Intraregional perspectives. In studies in the context of current intraregional perspectives, intensity and scale, and factors, reflecting aspects of technology and business dominate the techno-sociological framework of dimension. These styles of farming are often expressed as metaphors, referring to the dominance in farmers' logic. The styles reflect the diversity in passions for farming.
In studies where a diversity of farm opportunities for agricultural production is taken into account, the dimension *markets* is dominantly present in the framework, often related to the dimension *land use.* (For examples see Van der Ploeg 2003, Van Broekhuizen et al. 1997, Wiskerke 1997, Van der Ploeg 1996, Van der Ploeg, and Roep & De Bruin, in: Van der Ploeg & Long 1994, Leeuwis 1993, De Bruin et al. 1991, and Roep et al. 1991).

In my thesis (2003), I studied styles of pig farming within the constraint of a uniform market (for feeder pigs of 25 kg) and without the implication of land use aspects. I found that – under those constraints – the framework appeared highly dominated by labour productivity and the ambition for revenues, followed by intensity and scale (based on the *sow* as principle source for productivity) and the farmer's rationale about technology and business. Dimensions like succession, labour division and gender, the orientation on location, and the notion of locality, were still notable, but of lesser importance. I suggested that techno-sociological dimensions reflecting the willingness to make debts in financial, (techno-) ecological and socio-economic sense could be important, but that I failed to raise sound parameters for such dimensions.

Interregional comparison. In studies in the context of interregional comparison, the dimensional framework is the same as in studies for intraregional perspectives and/or the modernisation processes. An important constraint to these studies is the level of comparability between the regions. Regions are comparable if technical structures are more or less similar, and if the styles of farming can be analysed in reference to the same dimensions in these regions. This constraint is particularly relevant for the sociological dimensions, because results of questionnaires determine the shape of these dimensions. Differences in levels on calibration scales of the same dimensions reveal the interregional contrasts. (For examples see Oostindië & Peters 1994, and Hofstee 1985).

Chain studies. To distinguish the diversity among styles in various chain circuits, the leading dimension in the framework is not farming but product transformation. The focus in these studies is shifted from diversity in styles of farming to diversity in styles of integrated chain circuits (*styles of niching* – MC). The interest in chain studies is particularly relevant in situations where markets are not uniform. To incorporate the integrated system in the analysis, Van der Meulen (2000: 42) introduced the notion of *systemness*. Styles of niching reflect the vitality and the exclusiveness of circuits of farming, product transformation and consumption.

These different points of view are summarised in the following general definition:
Styles of farming are stylised characterisations of the diversity in passions for farming, represented by the farmers' dominant logic, expressed in what farmers say and do, and identified through analysis of clustered contrasts and differences in the practices of farmers, in reference to a framework of specific dimensions within a specified information space.

Style, type or system; farming, farm or farmer?
What is the difference between a *style of farming* (or *farming style*) and a type of farm, a kind of farmer, a farming system…, or any other combination of these terms?

Style. The difference between a *style* and a type (or any similar references) is in the aim and the objective of the knowledge acquirement:

> The aim for acquiring knowledge about *styles* of farming is to understand the diversity in logic among farmers. The objective is to make a clustering of farmers, who express a similar logic in their farming practices, in order to characterise a stylised image of the expression of the dominant logic of this group of farmers.
>
> The aim for acquiring knowledge about *types* of farms (or farmers) is to categorise farms (or farmers), to fit their variation group wise. The objective is to classify the farms (or farmers) in distinct groups using specified selection criteria.

The aim for acquiring knowledge about farming *systems* is to integrate the knowledge of the subsystems that create the whole of the farming enterprise. The objective is to describe and clarify the linkages between the subsystems.

Styles of farming are easier recognised – for example form the image that they raise from their metaphors, than defined. Analyses of only technical and techno-economic data of large databases (without support of sociological information) already reveal diversity in patterns of clustered data. It is difficult to say however, whether the resulting clusters of farms represent a *type* (Ilari 2004, 2003), or a *style* (Van der Ploeg & Roep 1988), because the leading dimensions in these analyses are *soil use* (related to the soil type) and *market integration* (related to the product types). However, Hofstee (1985, 1946) referred to differences in soil use of the same soil types when he introduced the term *style* for farmers of two villages, who chose different directions for development (dairy farming versus cereal farming) under similar conditions.

Farming. The English word *farming* refers to a dynamic activity; the farm is the result of the activity and the farmer the one, who is practices the activity. Thus, the English word refers precisely to the subject of interest. (In some languages, this term is hard to translate.) It is undeniable that on a farm where several people work and live, one can find a personal style of each of the participants. Moreover, from a sociological point of view the interactions between these personal styles are interesting to study. Different forms of personal interactions may lead to different farm developments. However, in a study of styles of farming one focuses on the activities, from which the present farm as a whole is the result. For styles of farming, one focuses on the perspectives, based on the actual situation and on the structural features in the surrounding information space. In order to understand these location-related perspectives, it is inevitable to ignore all causal (time-related) relationships between past and actual situation. Therefore, the term 'farmer' in studies of styles of farming *…refers to the group of people who shape the practices on a particular farm, or in a particular style of farming. In other words, in terms of styles of farming, the 'farmer' is an abstract notion of the 'acting agent'* (thesis, 2003).

Styles of pig farming in an intraregional perspective

In 1998, I conducted a survey among pig farmers in the production area in the east of The Netherlands: Twente and The Achterhoek (publication in 2003). I had made an extensive questionnaire, based on the results of open interviews among pig farmers throughout The Netherlands in 1996. From 70 pig farmers I received responses to the questionnaire as well as access to the technical data, derived from their management support programmes. After factor analysis and synthesis of relationships among techno and socio (-economic) dimensions, I found five styles of pig farming represented in the area. These styles reflected the diversity of passions for pig farming, expressed in the farmers' dominant logic. Table 1 represents the headlines of these five styles of pig farming in connection to the reference dimensions.

The hierarchy in the dimensions of the framework appeared as follows:

1. *Passion (as digit dimension).*
   All styles of farming are somehow passionate for pig farming, except the shifter.
2. *Labour Productivity and Ambitions for Revenues (integrated dimension).*
   The entrepreneur and the craftsman opt for increasing labour productivity and gaining profits, whereas the other styles of farming opt for gaining livelihood.
   The entrepreneur increases labour productivity through scale enlargement.
   The craftsman increases labour productivity through intensification.

The other styles or farming increase by obligation – for staying in business.

3. *Rationale for Farming: at equal hierarchical level.*
    a. *Intensity and Function of the Herd (linear dimension).*
        - Contrast between craftsman (intensive) and stockman (extensive).
    b. *Scale and Role of the Business (linear dimension).*
        - Contrast between entrepreneur (economy) and steward (capacity).
4. *Orientation on modernisation progress: at equal hierarchical level.*
    a. *Geographical orientation (linked to Labour Productivity and Ambition)*
        - Contrast in orientation between entrepreneur (international, global) versus steward, stockman and shifter (location and region).
    b. *Succession (linked to Passion and Rationale)*
        - Contrast in orientation between entrepreneur and shifter (open option) versus craftsman, steward and stockman (desired option).

Table 1. Styles of pig farming, represented with metaphors as stylised characterisations of the diversity in dominant farmers' logic. Clustered contrasts and differences in the practices of farmers identified the characterisation of the styles in reference to a framework of techno-sociological dimensions, within the intra-regional perspective of Twente and The Achterhoek in the east of The Netherlands.

Techno (-Economic) Dimensions:	*Labour Productivity: [Intensity * Scale]*	*Intensity: Productivity of the Sows*	*Scale: Sows per Labour Input*
Socio (-Economic) Dimensions:	*Ambition for Revenues; Profits, Livelihood and Private Satisfaction*	*Function of the Herd; Animals, Farm Identity and Techno-Ecology*	*Role of the Business; Labour, Efficiency and Market Participation*
Styles of farming (in Metaphors):			
Entrepreneur	Gaining Profits through Production Efficiency	Source for Passionate Optimisation of Farm Management Control	Specialised, Efficient and Highly Market Integrated in Global Chains
Craftsman	Gaining Profits through High Productivity Levels	Source for Passionate Devotion to Productivity from Sources (Sows)	Technically Professional Labour, Integrated in Quality Market Chains
Steward	Gaining Livelihood for Farm Continuity at the Farm Location	Source for Farm Security in the Context of Making a Living in Rural Life	Utilisation of Capacities of Family Members; Market Access through Regional Contact Chains
Stockman	Gaining Livelihood from Pig Farming at the Farm Location	Source for Farm Identity in the Context of Making a Living in Pig Farming	Utilisation of Passionate Labour for Pig Farming; Low Investment Levels
Shifter	Gaining Livelihood at the Farm Location	Source for Opportunities in other Passions in the Context of Farming	Routine, Efficiency and Low Investments; Search for Other Opportunities

Next, I analysed all the information I gathered of these farms and concluded that all farm assets had different values, related to the style of farming. The difference in values accounted for the principal production source (sows), for the principal product (feeder pigs of 25 kg), and for the burden of investments and of labour demand in the production system. Styles of farming had different farm sizes, different time managements and labour divisions, different investment patterns, different housing and feeding systems, different sow replacement and cull patterns, different genetic materials, different hygiene, health care, animal welfare and manure managements, and different market orientations and perceptions of consumers. Among all these differences, *efficiency* did not appear as an absolute value; it is a relative

value, related to the dominant logic of the farmer. The dominant logic of the farmers provides thus the embedding for the interpretation of data about farm performances.
The research illustrates that styles of farming have different qualities and different capacities for adapting to changing circumstances. They react differently to fluctuations of unstable markets and they will react differently to future events.

Example herd management: attitude towards hyperprolificacy
Hyperprolificacy refers to the phenomenon that, from selection breeding, some sows are capable of producing more piglets in a litter than they can nurse, simply because they do not have as much teats as piglets. This phenomenon is actually not abundant. More common is the phenomenon that piglet sizes vary within litters, particularly in relatively large litters, of 12 piglets or more. In both cases the farmer has a problem if he (or *she*; on farms with such style, women often have directive power) wants to maximise the number of piglets to survive.

There are management measures for farmers to maximise the number of piglets to survive from large or excessive litters, for example:

a. A farmer can install artificial equipment in a special (hygienic and heated) stable for nursing the excessive piglets.
b. After weaning the piglets of a sow with a good milk production, the farmer keeps the sow in the stable for lactating sows and presents her a group of the excessive piglets, instead of returning her to the herd of barren sows.
c. The same as in b, but in a system where the farmers removes the piglets from the mother sow after a week. With such system, there is less interference with the continuity of the gestation cycle of the herd.
d. Farmers regroup the piglets from sows, which farrowed together within a few days. They put large piglets with other large piglets with one sow, and small piglets with other small piglets with another sow. By regrouping, small piglets have less competition from large piglets and the number of piglets per sow can be maximised.

The efforts of maximising the number of piglets to be born and to survive have also a shady side. Small piglets are more susceptible to health problems than large piglets. The larger the litters, the more weak and small piglets are born, and the larger are the losses in the trajectory of raising them. From a technical approach, one may search for an optimum between gain and loss, and the amount of labour effort that it costs. However, from a sociological approach, there is a basic question about passion and logic. Is a farmer motivated to implement specific measures to try to maximise the number of piglets to be born and to survive? If so, can the farmer fit the measures technically in the available housing system, as well as in the ruling system for time and labour management? The answer ‘yes’ or ‘no’ is therefore a *package decision*, where optimisation can only take place after a principle decision about the implementation in the first place. That principle decision differs among styles of farming (thesis, 2003). I illustrate this at the hand of the data in Table 2, which shows technical data of three styles of farming: entrepreneur, craftsman and stockman.

Technical analysis. The data in Table 2 show that sows on farms with the style craftsman produce on average per litter 1.0 piglet more alive than the sows on the farm of a stockman, and even 2.8 feeder pigs more on a yearly basis, because of the additional effect of a higher farrow index. The style craftsman produces consistently higher data on all given indicators than the population average in the survey; the style stockman produces consistently lower data. Sows on farms with the style entrepreneur produce on average per litter the same

number of piglets (11.0) as the population average of the survey (10.9). However, at the end of the production trajectory, where it comes to counting the number of produced feeder pigs per sow [per year], the data (22.7) are higher than the population average in the survey (22.0). The technical data suggest that these styles of farming have used three management systems, involving litter sizes management and piglet grows management (Table 3).

Table 2. Technical data of indicators reflecting the productivity of sows in three styles of farming: entrepreneur, craftsman and stockman. N shows the number of farms on which the data are based. Below the data and the standard deviation (σ), there are indications (r: * p<0.1, ** p<.05) of the significance of the deviation from the total population average in the survey. The data show the accumulative effects of the contrast in technical herd management between the craftsman and the stockman. The entrepreneur achieves good productivity results in terms of feeder pigs (of 25 kg) per sow [per year], through a general management of labour efficiency and hygiene practices. The data represent the year overviews of 1997 of farms in the east of The Netherlands. (Thesis 2003.)

Technical indicator:			*No. of piglets born alive / litter*	*No. of weaners / litter*	*Farrow index: farrows / year [per sow]*	*No. of weaners / sow [per year]*	*No. of feeder pigs / sow [per year]*
Metaphor:	N						
Entrepreneur	19	μ	11.0	9.9	2.33	23.3	22.7
		σ	.4	.4	.08	1.1	1.1
		r				*	*
Craftsman	10	μ	11.5	10.2	2.37	24.2	23.4
		σ	.5	.4	.06	1.1	1.1
		r	**	**	*	**	**
Stockman	12	μ	10.5	9.4	2.26	21.4	20.6
		σ	.4	.4	.09	1.6	1.7
		r	**	**	**	**	**
Population (total survey)	70	μ	10.9	9.8	2.32	22.8	22.0
		σ	.5	.4	.08	1.4	1.7

Sociological analysis. At the hand of Table 1, one can predict the results in Table 2. There are two techno-sociological dimensions, which dominate the farmers' logic in the styles of farming: the function of the herd and the role of the business (i.c. labour and investments). Based on the questionnaires in the field survey and the additional comments of the farmers the rationales are the following:

A craftsman has a passionate devotion for sow productivity. A farmer with this style is devoted to have large litters and to raise the maximum number of piglets. In the selection of sows, he takes this as a criterion. Depending on the circumstances on the farm, the farmer has implemented technical measures and management procedures to deal with large litters and to maximise the number of piglets that survives, as a daily practice. Of course, this farmer has relatively a higher percentage of piglet loss, but in combination with a keen health programme, attention for insemination and a sound cull and replacement management, this farmer belongs to the top in terms of sow productivity. In the interviews with the farmers, farmers with this style underpinned that fact often, by proudly saying that they belong to the national top-ten percent! In the tendency of genetic developments towards hyperprolificacy, craftsmen will use hyperprolific sows to challenge their capacities for further increase of the sow productivity of their herd.

An entrepreneur however, is passionate for optimising farm management control. The management systems required for dealing with the birth and survival of the extra (weak and small) piglets, is not labour efficient. Therefore, this farmer neither implements much of these management systems, nor seeks for the genetic material to get these extra large litters. On the

other hand, though, the farmer is very keen in the trajectory of raising the piglet on the health programme, the attention for insemination and the cull and replacement management, leading to top productivity results per labour input. However, these results require sound investments in modern housing, farm automation and equipment. An entrepreneur is prepared to invest in housing and equipment though, if this leads to a higher labour efficiency.
A stockman is passionate for pigs, but an economic investor. A stockman is unlikely to renew or renovate stables and equipments before wearing them out. Therefore, a stockman accepts implicitly that his herd has relatively more housing-related health problems than other styles. For a stockman the aim is not to maximise (or even optimise) the number of piglets to be born and to survive, nor the best farrow index. The aim of the stockman is to keep the herd as healthy as possible under the housing circumstances. Health comes before productivity. A stockman would therefore not take measures to increase sow productivity, if these measures would increase the health risks. Of course this is relatively speaking. However, the aims of a stockman for sow and labour productivity are at another technical level than the aims of an entrepreneur or a craftsman.

Table 3. Combinations of Different aims of three contrasting styles of farming with respect to litter size management and piglet growth management: craftsman, entrepreneur and stockman. Two contrasting combinations are 'illogic'. These combinations occur only as incidents in connection to health problems, though not as styles of farming. Some combinations, marked 'p.m.', are insufficiently discussed in this article to fill in.

Aim for large litters:	*High*	*Medium*	*Low*
Aim for piglet survival:			
High	Craftsman	Entrepreneur	- (illogic) -
Medium	- (p.m.) -	- (population average) -	- (p.m.) -
Low	- (illogic) -	- (p.m.) -	Stockman

Conclusions

a. When the technical data for sow productivity are split for the styles of farming, they show different patterns for each style of farming, suggesting different management systems.
b. The sociological analysis of the dominant logic of the styles of farming coincides with the results in the technical analysis, confirming a different logic for management.
c. Hyperprolificacy is a challenge for a craftsman, but not for other styles of farming. In future, the deviations from the population average concerning sow productivity will therefore increase among styles of farming.
d. The data reflect the result of dominant logic that the farmers apply. Vice versa, the dominant logic of the farmers predicts the resulting data. This is an ongoing process. However, the farmers express their logic at the same time as when the data are available. It is therefore impossible to determine direct causal relation between the dominant logic and the data; data and logic coincide.

Example national and regional management: disease risk

The outbreak of swine fever in 1997/1998 in The Netherlands was the first disease outbreak to alert farmers, government and public of the consequences of the combination of the EU non-vaccination policy (implemented in 1992) and the Schengen-agreement (EU agreement on open borders; implemented in 1994). Until then the Dutch agricultural sector had focussed on the positive aspects: market and trades expansion, from which particularly the Dutch agrarian transport sector was profiting. There had been warnings however, from various disciplines, like veterinary epidemiologists and other animal health experts (including myself), but the entire agricultural structure of government, institutions, unions and enterprises was not open for taking measures.

From a sociological perspective, I based my warning on observations about diversity in styles of farming in 1995/1996. The diversity that I encountered I explain here at the hand of two styles of farming, which particularly contrast in their orientation on information: entrepreneur and steward.
The *entrepreneur* is internationally oriented, and anticipated fast on the opening borders. Trade of pigs and feeder pigs throughout Europe became a growing market for Dutch pig producers. This boosted the Dutch animal transport sector, increasing their quota and their outspread through Europe. In the management system on the farm of the entrepreneur, hygienic measures increased meanwhile, though not particularly linked to the international transport, but linked to their dominant logic of farming as a whole (see previous example).
The *steward* is regionally integrated, both in the natural and in the social environment. A steward seeks and maintains market contacts through regional chain traditions. The market integration in the larger structures is indirect, through the (traditional) regional contacts. Since the style of steward has often mixed a farm system (dairy cattle, cereals), hygiene barriers are much less strict than with the style of entrepreneur, and often considered 'illogic'.
The *transport sector* in The Netherlands is open organised: most transport enterprises are independent. There are few contract bonds, which tighten transport means to certain lines or sub chains. Thus, the transport sector became a risk factor for disease outbreaks on farms.

The way the swine fever outbreak of 1997/1998 developed, confirmed largely what the warning had predicted: the transport sector initiated the outbreak and in combination with the continuing social contacts in the region, the disease spread fast (Elbers et al. 2001). The following observation of the outbreak that is significant in this context. The outbreak took place in a relatively new area of farmer colonisation (about 100 years = 3-4 generations ago), in which the colonisation has taken place in two stages. The colonisers in each part brought and kept their own network of suppliers and contacts for transport over the generations. Although the epidemic spread extremely fast in the part where it had broken out, it took four months before the swine fever effectively spread in the other part. Because of the extreme density of the pig population in the whole area, there was no other likely explanation for that phenomenon, except the differences in networks of the colonies (personal observation 1997; thesis 2003). Note however, that the outbreak did not cause its societal severity directly; the combination of being an exporting country (about 40% of the national pig production) and the EU regulations on disease management (including border closure) turned the event into a national crisis.

After the swine fever outbreak, and in addition after the outbreaks of foot- and mouth disease (2000) and fowl plague (2003), the Dutch government launched several series of measures to improve the hygienic status of farm and transport means, and to reduce all transport of pigs, particularly of live pigs. An initial resolve to create technically (and not socially based) isolated cluster zones for pig production was covered by political issues for regional development, and foundered through lack of technical opportunities and funding. None of the resolves or regulations was aimed at the reconstruction of the transport sector however, to isolate high-risk transport (and their contact farms) from low-risk (local) transport.

The government measures for improving the hygienic status of farms and transport means were much harder to implement for the style steward than for the style entrepreneur. For stewards the measures often involved investments for extensive building reconstructions. Particularly the obligation for creating a washing facility for transport means, as well as the fact that local transport of animals was restricted under the same regulations as long distance

transport, raised protest. On some farms, it was impossible to implement these measures. Many stewards thought that part of the measures was correct, but part of them was 'illogic'. The measures did not solve any problem that existed on their farm, demanded extensive investments for which they did not see the benefit, disrupted their regional contact structure, and created a technical isolation from the nature environment for which many of them cared (i.c. bird protection).

Conclusion and Discussion
EU and national regulation systematically favour the entrepreneurial style of farming over other styles of farming, like the stewards.
Entrepreneurs have the largest farms and are the most efficient in terms of labour efficiency. However, that does not make them a better style of farming in societal perspective. Because of their lesser integration the natural and regional environment structures, they are a lesser supporter of the liveability in the region. On long term, they do not have a better perspective than other styles of pig farming, because the cost structure in The Netherlands will cease to be competitive to the countries that are emerging in the market (Spain, Brazil, etc.).

Methodology for conducting a techno-sociological research of styles of pig farming
The essentials of studying 'location-related perspectives' in a space of information are knowledge of the existing technical structures, determining the reference dimensions, and reflecting with the subjects on their positions and perspective. Since the aim of such study is to understand different wholes of dominant logic of farmers, which one can follow in its way of expressing, and which one can explain in reflection, the study is a stepwise process. The opening is to know and understand the existing structures, their linkages, and to determine reference dimensions in the information space, related to the research outline (intersectional, intraregional, market related, etc.). Based on the information, a set of existential questions for the farmers is tested and used in questionnaires, and combined with specific technical data, to determine, understand and describe the styles of farming. The closing step is the explanation to the farmers, about how science has understood them, and the reflection with the farmers about the options for future perspective. In conclusion, the study of styles of farming is stepwise, with iterative steps of knowledge gathering and knowledge conversion.

Example of a research outline in France: Bretagne and the Mid Pyrenees
In Mars 2004, a research project started to identify *styles of pig farming* in France in two areas: one in Bretagne and one in the Mid Pyrenees. The work concerns the pig producers, covering both the activities for farrowing and finishing.
The objective of the research is to represent and understand the diversity in styles of pig farming in order to improve (i) our capacity to interpret the technical management data that are systematically generated of the farms, and (ii) our apprehension of the perspectives of the pig farmers in these areas and the various ways of being a pig farmer. We equally expect a contribution to the *liveability* of the profession and its *sustainable* character, as seen from the farmers themselves.
The methodological approach is an iterative protocol of reflections among scientists and with farmers: qualitative and quantitative data collection – open interviews with experts and farmers, followed by structured questionnaires and computerised analysis. The qualitative information serves to support the development of the structured questionnaires and the interpretation of their results. From the results, a limited number of *styles of farming* (usually three to seven) are distinguished. The last phase of data collection is organising reunions with the farmers about how science has understood their logic in terms of *styles*, in order to make

conclusions about the preferred metaphors to reference the styles, and to make a strategic synthesis of the diversity in farmers' perspectives.

We have planned the research phases and the collection of data as follows:
March – June 2004: We conduct open interviews with the *technical environment* in which the pig farmers operate (about 6 per area): with extension technicians from various organisations. The interviews cover the (infra)-structural features for pig farming in the area, the way communication is organised, and the variety that the technicians observe among the farmers. Based on the information, we list questions for open interviews with the pig farmers, as well as 'possible candidates' of farmers, who – together – provide a good overview of the existing variety.
July – September 2004: We conduct and record open interviews with a variety of pig farmers (about 25 per area), consisting of existential questions, for getting a scope of the existing variety in their logic, their *ambitions* and *rationales* for pig farming. We transcribe and analyse the recordings, and used them for the development of a structured questionnaire.
October –December 2004: We conduct structured questionnaires with a representative sample of farmers (about 90 per area), of two different farmers co-operatives in each area. We combine the data of the questionnaires with the technical farm management data, for the analysis of techno-sociologically based *styles of pig farming*. The data are analysed with computerised methods, and used to distinguish the *styles of pig farming*: characterisations of differences in the dominant logic among the farmers. Based on these findings reunions with the farmers are prepared.
January – February 2005: Together with the involved farmers' co-operatives we organise group reunions (about 3 per area) with the farmers and the technicians to discuss how science has understood their ways of farming. We analyse how the pig farmers acknowledge and recognise the *styles of farming*, and how they evaluate their options and perspectives for improving the liveability and sustainability of pig farming in the region.
After – February 2005: We will publish a bilingual account (French-English) of the iterated scientific inputs, results and conclusions of the consecutive research phases, leading to the synthesis of strategic structural options.

Discussion
Intensity and scale can explain interregional differences in production circumstances for farming (Hayami and Ruttan 1985, 1971). This explanation is incomplete. There are social structures that interact with the technical and techno-economic structures. The concept of styles of farming is build upon that notion (Van der Ploeg 1994). Styles of farming are stylised characterisations of the diversity in passions for farming, represented by the farmers' dominant logic. The aim for acquiring knowledge about styles of farming is to understand the diversity in logic among farmers. If scientists explicit how science has understood the logic of the farmers, they can better reflect with the farmers about the options for future perspective.

What are the strategic options for pig farming that can be build upon?
There are discussions all over Europe about the perspectives of farming, particular in face of the price crises, which seem to last longer and recover less, each time they come (Van der Ploeg et al. 2002). The last crisis on the pig market started in early 2002 and the long last recovery of the past few months is not abundant.
Market orientation on long term is subject to extensive debate. Some scientists think that uniform sales will continue to dominate the market for pigs and other farm products (For example see Van Bruchem c.s. 2004). Others expect that North-Western European pig farmers will loose their markets anyway, unless they are able to diversify. There are signs that

the markets are differentiating. A market for cut parts with differentiated prices for ham, shoulder, etc, is developing in France as well as in The Netherlands. The current policies of the European Union boost origin designation and labels, like protected geographical indication (PGI), protected designation of origin (PDO), organic, and certificates for special character (CSC). In addition, the variation in transmission types increases. Many traditional delicacies, like pâté, dried meat, sausages, etc., are under a process of revival. Furthermore, there is a growing market for prepared plates, which is simultaneously diversifying into 'convenience food' and 'delight food'. If this diversification of markets becomes a serious development, it will have implications for the whole supplies, production, sales and chain infrastructure. Styles of farming will have a variety of options to anticipate on diversification.

Example in the Mid Pyrenees: sub-regional opportunities for diversification
Currently the French national institute for agricultural research, INRA, is conducting a comparison study about styles of farming in Bretagne and the Mid Pyrenees. The dominant dimensions for evaluation are the ones described in the introduction of this article, for analysis under uniform market conditions: productivity, ambition for revenues, intensity and scale, as well as the function of the herd and the role of the business.
In the Mid Pyrenees however, the market for pigs has already somewhat diverted from the uniform market through the introduction of the 'Bayonne ham', a 'special product' that is produced all over south-west France. All pig farmers in the study area in the Mid Pyrenees produce according to the prescriptions for 'Bayonne ham'. The slaughter pigs are slightly heavier and more larded that the uniform standard, which is commonly produced in Bretagne.
The future perspective for pig farming in the Mid Pyrenees is bleak; the pig sector is in regression. If the pig sector in the Mid Pyrenees can find a future perspective, it is in further regional diversification, under the new EU regulations. Initial results of the study about styles of pig farming showed structural sub regional differences, linked to the dominant logic for future market orientation in two sub regional parts: the departments Lot and Tarn (Table 4).

Table 4. Overview of the features of the technical structures and infrastructure of two departments in the Mid Pyrenees in France. Lot is situated to west of the department Aveyron, and Tarn to the south. Together the three departments form one production area. Differences in farmers' logic are emerging in the perspective of EU label protection, related to differences in sub regional structures.

Department:	*Lot*	*Tarn*
Chain features:		
Abattoir	Exterior	Interior: Lacaune
Feedstuff sources	No / acid soils	Cereals (traditional)
Urban metropolis	Distant	Toulouse, Montpellier
Option focus	CSC 'Red Label'	PDO 'Lacaune'

Table 4 shows clearly that different sub regional structures and differences in dominant logic are related. The lack of opportunities for feedstuff production, a slaughterhouse, and nearby urban areas in Lot, make a general label, like Red Label, a better option for those farmers than any label with a regional designation. For the farmers in Tarn it is the opposite.
In the region the sub diversion into these split directions might create potential for positive interaction, a so-called 'win-win-situation'. Farmers that turn to producing 'PDO Lacaune' will get tight only to the transformation station in Lacaune. The transformation station has much more slaughter capacity however. They might want to strengthen their image of a 'quality transformation station'. A good option for such strategy is to attract more 'quality pigs', like the pigs that are produced under the 'CSC Red Label'.
In this development, the position of the transformation station in information space is crucial. Not only the strategy of the station itself, but also the (EU and government) policy on the pig

slaughter sector is vital. EU regulations in the 1990s on slaughterhouse hygiene have largely reduced the number of medium-size transformation stations. If the slaughter sector is over-streamlined, the potential for pig production diversification is suppressed (thesis 2003). Note: After a scenario study in 1994 of these *styles* in circuits of the regional beef sector in Umbria in Italy, (Van der Meulen 2000), the regional administration decided to postpone a planned 'rationalisation' of small-scale slaughter plants.

Techno-sociological support for farming-styles-related herd management
Management support decision models are currently streamlined, based on the implicit assumption of an entrepreneur (in economic models) or a craftsman (in technical models). The aim, objectives and constraints, as well as a desire for model optimisation for the farmers, are derived from general assumptions. Styles of farming analyses do not only show that there is a diversity of aims, objectives and constraints, depending on the farmers' logic, they also show, that the optimisation is not a linear process. There are sets of management options, which a farmer might or might not implement on the farm, depending on his dominant logic: his style of farming. Therefore herd models for farm support should build up from modules, which can be combined in 'logic' combinations, to support the various styles of farming specifically.
For example. The aim of the style entrepreneur is maximising profits. The objective is cost reduction. The herd model for this style is a specialised pig farming model, with clear constraints from the perspective of labour efficiency. Inefficient technical novelties, like hyperprolificacy, are excluded. The farm model is a specialised pig farm. In the evaluation of cost reduction, the transfer to another location is among the options.
The aim of the style steward is farm continuation with the family on the farm location. Transfer to other locations is not among the options. Shifting to other farm branches, as well as new types of enterprising, as tourism, social care and home product transformation are opportunities that might emerge in the model, for the model is based on a mixed farm. The constraint is however, that the family members can do the workload and that the investment level does not put farm continuation at risk.

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