



Merger in land data handling, blending of cultures

W.T. de Vries, T.N. Muparari & J.A. Zevenbergen

To cite this article: W.T. de Vries, T.N. Muparari & J.A. Zevenbergen (2016) Merger in land data handling, blending of cultures, Journal of Spatial Science, 61:1, 191-208, DOI: 10.1080/14498596.2015.1068230

To link to this article: <http://dx.doi.org/10.1080/14498596.2015.1068230>



Published online: 04 Jan 2016.



Submit your article to this journal [↗](#)



Article views: 56



View related articles [↗](#)



View Crossmark data [↗](#)

Merger in land data handling, blending of cultures

W.T. de Vries^{a*}, T.N. Muparari^b and J.A. Zevenbergen^a

^a*Faculty of Geo-Information Science and Earth Observation, University Twente, Enschede, Netherlands;*

^b*Department of Surveying and Geomatics, Midlands State University, Gweru, Zimbabwe*

Land administration concerns the handling of spatial and legal data on land. In many countries this is executed by two separate agencies, cadastres and land registries. Despite international literature claiming that merging such agencies is more effective for the data handling, in practice staff within land agencies tend to struggle with such mergers. This article reviews the case of the Swedish land administration merger to study this phenomenon. The review uses cultural theory to understand individual perspectives on mergers, and uses a combination of qualitative and quantitative analysis to uncover co-existing values before and after the merger. Surprisingly the post-merger agency exhibits a stronger preference for hierarchical rules and peer control in data handling than the pre-merger agency, even though staff relations have remained relatively flat. Hence, values of staff members may change in different ways than what one would require for a change toward integrated data handling.

Keywords: corporate culture; land administration merger; cadastre; land registration; competing values framework

1. Introduction

European land administration systems have historically evolved along two separate activities: land registration and cadastral surveying (Bogaerts & Zevenbergen 2001; Silva 2005; Çagdas & Stubkjær 2009). Land registration serves the legal recording of rights, while cadastral surveying primarily serves the recording of boundaries and the calculation of land taxes (Silva 2005). Kaufman and Steudler (1998) refer to separate organisations responsible for the management of each type of activity ('Cadastre' for surveying and mapping, and 'Register' for land registration). Zevenbergen (2002) adds that the growing relationship between the two components has compounded

the duplication of data and efforts, and led to overlaps in organisational functions and processes. Bogaerts and Zevenbergen (2001) identify that there is almost 70% of data duplication when comparing the two activities and associated organisations, and suggest therefore to seriously consider unification of the two as one of the possible strategies to reduce the effects of duplication. This would also improve the societal expectations of the land administration systems as a whole.

Mergers between the organisations have, however, often been difficult due to large differences in specific organisational mandates, professional skills of staff members and political-administrative contexts in which the

*Corresponding author. Email: wt.de-vries@tum.de. W.T. de Vries is now affiliated with Technische Universität München (TUM).

agencies are usually operating. Land registration organisations tend to be closely related to either Ministries of Justice, legal courts, notaries or conveyancers, whereas cadastral surveying organisations are usually embedded in national survey or mapping organisations, sometimes even within ministries of defence. Staff members in the former are required to have a legal administrative (social and legal sciences) educational background, in the latter a technical surveying engineering or geodesy background. As a result, work conventions and priorities of work-related processes tend to be entirely different. Reconciling these through or during a merger is not obvious, as many other organisational mergers have proven.

How and why to merge land administration agencies differ, however, per country. The primary discourse of mergers is rationalist, emphasising economic gains of increasing efficiency and technical gains of standardisation and reduction of redundancy. European land administration systems in the Netherlands, Hungary, Lithuania, Sweden, Romania, Turkey, France and Cyprus have since pursued the decision to unify the land registration and the cadastral functions (Bogaerts & Zevenbergen 2001; Österberg 2003; Yomralioglu 2003; Silva 2005; Bronislovas 2010; Elikos 2010; van der Molen 2010), while the UNECE / WPLA has had the issue of 'unified cadastre' on their agenda since their workshop in Bishkek in 2013.¹ The difficulty encountered is a different understanding of how cadastral systems should operate (Kaufman & Steudler 1998). Moreover, it is difficult to compare the performance of cadastral systems since they do not have one standard style of technical management. The primary anticipated benefits in the land administration realm of the unifying or merging of the two types of activities into one organisation are claimed to be: (1) the improvement of customer service given the single point of entry and delivery; (2) provision of better quality in data and services; (3) increase of efficiency within processes and

in between organisations; (4) improved relation between government agencies and citizens; (5) a more efficient operation of land markets (Steudler et al. 1997; Kaufman & Steudler 1998; Bogaerts & Zevenbergen 2001; Williamson & Ting 2001).

Whereas the past and current merger discourse has primarily focused on the techno-organisational aspects of mergers (emphasising efficiency, operational or process integration, information integration), it lacks a crucial element, namely the human-resources perspective (Muparari 2013). For mergers it is, however, important to note that staff members working in a land register are primarily educated and groomed as lawyers and legal advisors, whereas those working in cadastral surveys are predominantly more technically oriented engineers, such as land surveyors, topographers and cartographers. So, instead of understanding the best pathway, the causes or the reasons for any merger, we aimed to understand human behaviour from the point where a merger has either become inevitable, or is being considered. Our question at this point was how to trace possible staff views and behaviour which could ultimately explain certain inter-organisational support for or resistance to mergers.

This human-resource perspective on merging can be researched by looking into organisational culture, and the changes in corporate culture in particular. This requires, however, a method to evaluate corporate culture changes through capturing the ex-ante and the ex-post way of operation.

This article aims at answering the question: what can a corporate culture perspective contribute to the dilemmas, problems and solutions when land administration agencies consider pursuing a merger between the cadastral (mapping and recording of boundaries) agency and the registration (or recording and/or determining of rights) agency? The present research draws on data from Sweden, where only recently, in 2008, a merger process was completed after discussions for more than 15 years. In Sweden

a merger between the land survey agency (Landmateriet) and the land registry (originally under the authority of the courts) took place in 2008 (Österberg 2003). The computer systems of both organisations had already been integrated since 1995, yet both organisations still functioned separately. In 2008 the two began to function under one authority and under one roof. Though the merger was completed, in reality the work processes of the two agencies are still intact and the features of the previous organisation are still visible. Given this, the main focus of our research was not on describing the main historical path towards the decision on the Swedish merger, but to understand what happened to staff members' values once the merger had taken place, and how this experience can be relevant for other agencies which are contemplating a merger. The normative and political question on whether merging is good or bad was left out of the present research.

The exploration further includes the utilisation of Q methodology, with which we aim to show an alternative way of deriving data and interpretations on organisational phenomena. The exploration through a single case study could be of use to the overall discourse on mergers of public agencies, and in particular those recording public and/or spatial data.

2. Merger of land agencies In Sweden

The origin of the cadastre of Sweden can be traced back to the 1530s when cadastral books were used for land taxation as required by the king (Österberg 2003). These cadastral books compiled real properties or land parcels according to each village. Later in the 1600s the cadastral book became a useful instrument to compile population data. In the 17th century a cadastral map was introduced and used together with the cadastral books. The main purpose of this combination was to improve the taxation of land and make it more just and

equal, by surveying the area and value of each land parcel.

The discussion of mergers in Sweden started in 1993 with a strategic memo proposing an authority handling all issues concerning real estate property. At that time the land registries were part of the local courts, the cadastre was managed by the regional cadastral authorities, property formation by the local cadastral authorities and property taxation by the tax authorities. In 1996 all cadastral authorities merged into 21 regional authorities under Lantmäteriverket, the central mapping and cadastral agency, and this vision was starting to be fulfilled. In 1998 an inter-governmental committee proposed merging the land registries with the regional cadastral authorities, but at that time the Minister of Justice declined to do so. The reason was said to be the lack of legal competence within the regional cadastral authorities.

An important element in the discussion on mergers was the ambition to decrease the courts' activities. The courts ran several kinds of registers, and they were at different times distributed to different authorities. In 2001 the government decided to reduce the number of courts handling the land register from around 90 to seven. This was meant to increase the efficiency and to secure access to competence. A few years later the issue of merging the land registry and the cadastre was again brought up, and this time it was carried through very smoothly. In 2008 the merger took place, just a few months before all authorities under Lantmäteriverket merged into Lantmateriet. The government still demands that Lantmateriet keeps the seven land registry offices.

3. Mergers and corporate cultures

Mergers of land agencies can be researched by looking at how they affect people and their behaviour. One of the explanatory frameworks to describe people's behaviour within an organisation concerns 'corporate culture',

hence we are interested in how the corporate culture changes when separate agencies merge into a unified agency. The theory on corporate cultures is strongly rooted in the overarching theory of cultures. Hofstede et al. (1990) and (Herzog 2008) classify the key features of what culture is. A culture consists of core shared values, which are implicitly translated into rules and norms according to which people behave, and which are explicitly visible in people's symbols, practices, artefacts and behaviour. Herzog (2008) underlines that 'shared values and beliefs help individuals understand organizational functioning and thus provide them norms for behaviour in the organization' (p. 1). Yet again values reflect the good and the bad (basic assumptions) amongst the organisational members. Values form 'the bedrock of a company's cultural identity' (Deal & Kennedy 1992, p. 4), and by understanding the values one can understand how and why organisations behave as they do.

The models of Hofstede et al. (1990) and Herzog (2008) help to understand why behaviour within organisations can be different, even though the institutional context of organisations may be similar. A 'corporate culture' is namely rooted in the collective values that employees share. Employees' shared perceptions embody corporate culture (Chatterjee et al. 1992; Carroll & Harrison 2002; Zaheer et al. 2003). The implication is that in practice the symbols, practices, artefacts and behaviour will be different when comparing two similar organisations, not because the employees simply prefer other symbols, practices, artefacts and behaviour, but because these embody a different set of core norms and rules, and more deeply a different set of core values.

The role of core values is crucial when considering organisational problems in the case of a merger between two organisations which operate in one domain, or one sector. While the tasks and outputs of each isolated organisation may be inter-related, the core values of each organisation are rooted in the

historically transmitted values by the people who operate within its boundaries. They have not only grown to work within the organisation, but have also been selected as new incoming members on the basis of certain shared values. Consequently, the corporate culture differences can result in a merger failure or merger under-performance, because the new group of staff members cannot quickly overturn their own values, and there has been no evolution of values consensus via selection and grooming. As corporate culture is perceived as the 'collective programming of the mind which distinguishes the members of one group of people from another' (Vracking 1985, p. 16), the initiative to merge organisations brings distinct groups of different corporate cultures under one authority to share information, knowledge, processes, programs amongst other things in order to support the set goals and objectives (Hill 1990). In that case each group of employees in a merger is expected 'to unlearn, to de-commit, to develop new skills, to explore, to learn at a number of different levels, or to newly commit to different approaches' (Vracking 1985, p. 16). As such this paper strives to identify the changes that occur after the merger through the corporate culture lens.

Though values represent the cornerstones of every culture, these exact values are highly intangible and invisible, and need to be indirectly derived from the visible artefacts, practices and behaviour. A first step to make the variation in values more explicit is by using the diagnostic competing values framework of Cameron and Quinn (2011). This framework makes use of four archetype corporate cultures, labelled 'clan', 'adhocracy', 'hierarchy' and 'market' (Cameron & Freeman 1985; Boyne et al. 2004). The four archetypes differ in two dimensions: the degree to which the corporate allows flexibility or is based on a high level of control, and the degree to which the corporate management focuses on the external (e.g. clients, the market) or the internal actors

and processes (e.g. morale of employees and how work is accomplished). A clan culture is highly flexible and has an inward focus. Employees feel like an extended family. A hierarchy culture has an internal focus but emphasises centralised management control. It is typically bureaucratic and rule-based. Adhocracy culture is one which is flexible but with an external focus. There is a preference for adapting or responding quickly to external demands. Finally, market cultures emphasise centralised control while focusing on external issues. Employees are evaluated against each other, whilst there is a strong focus on performance and competition.

For each archetype nine operational aspects were identified (staff climate, communication, bonding systems, leadership, strategic emphases, change style, autonomy of individuals, standardisation of work processes, standardisation of professional training). The choice for these nine operational aspects is derived from the combination of literature sources on such archetypes (Ernst 2001; Cameron & Quinn 2011). The use of these aspects further supports the possibility of evaluating a denser granularity of views. This would make it possible to better unravel the variety in perceptions towards their new colleagues (e.g. in the form of staff climate) and the possible role of shared education in separate organisations (hence the inclusion of standardisation of professional training). With the distinction between archetype cultures it is possible to look empirically into given organisations and classify the extent to which a given organisation's corporate culture matches with a particular archetype or a combination of archetypes. A shift in the match after a merger identifies the shift in corporate culture.

4. Q methodology

Even though the adapted competing values framework provides a fundamental basis for assessing and comparing the actual corpo-

rate culture, empirically core values need to be observed through the artefacts of people, and in particular their views, statements, preferences and symbols. In other words, the characteristic aspects need to be derived from these artefacts. One accepted method for such an empirical task constitutes Q methodology (Watts & Stenner 2012). This method was preferred over other possible methods to collect views, such as coding transcripts from individual interviews, interpretation from focus groups or conventional statistical analysis from (un)structured questionnaires. Unlike open interviews, which can only derive subjective views based on expressed meanings in the given context of the interviews, Q methodology derives subjective meaning in a more structured and holistic way, as it aims directly to describe collections of subjective views and perceptions. Unlike employing questionnaires with fixed answers, which only allow interpretations based on individual answers in relation to fixed questions, Q methodology is more holistic because it forces people to express a wide variety of views and prioritise within the breadth of views. Essentially, the culture archetypes are just a tool to elicit subjective reactions from Q participants on which aspects of organisations people agree with and which ones they do not. They are in other words not the archetypes of land administration organisations, but they represent typical styles of cultures and associated preferred management choices. Finally, unlike conventional statistical analysis it is based on connecting similarities and correlations between views rather than finding similarities between people.

Q methodology is not a conventional technique yet in geospatial studies, but it is widely accepted in studies which require insight into subjective, political and qualitative choices (De Graaf & Van Exel 2008; Webler et al. 2009; Cuppen et al. 2010; Stergiou & Airey 2010). The quantitative part of Q methodology relies, however, on techniques similar to those in remote sensing or geostatistics, such

Table 1. Q statements

Statement no.	Cultural attribute	Statement	Archetype culture
1	Staff climate	We depend on each other to complete a task. We share information and knowledge amongst us	Clan
2		In this organisation anyone who cannot follow or lead must get out of way	Market
3		We depend on improving standardised procedures which were established long ago. We therefore have low risk	Hierarchy
4		We break new grounds and seek for new opportunities all the time. We are willing to stick our necks out and take risks	Adhocracy
5	Communication	We have open and frank communication with our leaders. We are free to propose unconventional ideas for facing problems and opportunities, and to introduce conflicting opinions without fear of reprisal	Clan
6		We abide by and stick to planned procedures set for a particular goal or task at that particular moment. We do not oppose or raise conflicting opinions about either the task or goal or the procedure itself	Market
7		We are organised into departments according to our specialisation. Each level has a level higher that itself and must execute orders as given	Hierarchy
8		We are not structured and ordered by rules	Adhocracy
9	Bonding systems	We are held together by an emphasis on loyalty, cohesion and tradition. Commitment is very high in our organisation	Clan
10		We are held together by the emphasis on tasks and goal achievement. A production orientation is shared	Market
11		We are held together by formal rules, procedures and policies. We stick to procedures and rules which are based neither on individual authority nor on group participation	Hierarchy
12		We are held together by commitment to innovation, experimentation and development	Adhocracy
13	Leadership	Our leaders are mentors, facilitators and reflect parental figures. They expect us to understand for the sake of our future term	Clan
14		Our leaders are producers, and competitors, tough and demanding. They make sure we meet the stipulated goals and objectives	Market
15		Our leaders are co-ordinators, monitors, organisers and rule enforcers. They expect us to follow established rules, policies, and procedures	Hierarchy
16		Our leaders are innovators and risk takers. They expect us to take risks and be innovative	Adhocracy

Statement no.	Cultural attribute	Statement	Archetype culture
17	Strategic emphases	Our emphasis is based on people development by investing in knowledge development and community building	Clan
18		Our organisation places its emphasis on achieving the measurable results and markets. Its focus is on productivity	Market
19		Our emphasis is on meeting standards and stability. Keeping things the same is important.	Hierarchy
20		Our emphasis is on creating new things, growth and acquiring new resources	Adhocracy
21	Change style	We review processes and goals, after a long period. The change is very slow	Clan
22		Our emphases are on pursuing continual adaptation and innovation – lead to fast change in the market, acquire and keep necessary external resources	Market
23		We incrementally change and improve the existing processes. We mind about consistency	Hierarchy
24		Our emphasis is on the transformation of resources	Adhocracy
25	Autonomy of individuals	Decision-making is not done by individuals but by all of us. Individuals have no right to decide for everybody	Clan
26		Decision-making is not done by anyone. Decisions are made by our directors. We have low independency	Market
27		We have a clear distinction between the lower ranks and the higher ranks. The lower offices execute decisions that are already set and cannot decide	Hierarchy
28		We are motivated by autonomy or independence. We guide ourselves and not all of us can have one approach to do things	Adhocracy
29	Standardisation of work processes	We rarely have any standardised work processes. In the case of a conflict we resolve it ourselves without seeking formal means	Clan
30		Sometimes we do have standardised work processes. We are good at listening and obeying instructions coming from our directors or supervisors	Market
31		We have clear lines of authority over processes. We are led by appropriate procedures, rules, policies, guidelines to execute the processes	Hierarchy
32		We have flexible processes that can be adjusted to suit the changing human needs. We are highly competent and like to do our own things in our own way	Adhocracy
33	Standardisation of professional training	Our professional training standardisation is very low	Clan
34		Our professional training is rarely standardised	Market
35		Sometimes our professional training is standardised but at times is not	Hierarchy
36		We have undertaken long and difficult standardised professional training	Adhocracy

Table 2. Q distribution table merger (total 36 cards)

Extremely bad for L/A organi- sations1 card(-5)	Very bad2 cards(-4)	Rather bad3 cards(-3)	Slightly bad4 cards(-2)	A bit bad5 cards(-1)	Neutral6 cards(0)	A bit good5 cards(+1)	Slightly good4 cards(+2)	Rather good3 cards(+3)	Very good2 cards(+4)	Extremely good for L/A organi- sations1 card(+5)
---	------------------------	-----------------------------	-------------------------------	-------------------------	----------------------	-----------------------------	--------------------------------	------------------------------	----------------------------	--

Table 3. Q factors for post- and pre-merger

Statement #	Average / standard deviation		Post-merger factors				Pre-merger cadastre factors				Pre-merger registration factors			
			1	2	3	4	1	2	3	4	1	2	3	4
1	3.58	1.44	4	5	2	5	2	5	4	2	4	5	1	4
2	-2.25	1.54	-2	-2	-4	-2	1	-2	-3	-4	-3	-2	0	-4
3	-0.08	2.11	1	-3	0	-1	-1	-3	2	1	2	-3	3	1
4	-1.75	1.42	-2	-3	0	0	-2	-3	-2	0	-2	-3	-4	0
5	2.33	1.61	3	4	2	3	0	4	3	1	3	4	-1	2
6	-0.67	1.07	0	-2	0	-2	-1	-1	-1	0	-1	-1	2	-1
7	1.58	0.51	1	2	2	1	2	2	1	2	1	2	2	1
8	-2.67	1.87	-3	0	-5	-3	-2	0	-3	-5	-3	0	-3	-5
9	2.75	1.96	4	0	4	4	3	0	5	5	4	0	1	3
10	1.25	1.54	2	-1	1	3	2	-1	3	2	3	-1	1	1
11	0.83	1.99	2	1	1	-3	4	1	-1	0	-1	1	4	1
12	-0.58	1.24	-1	0	0	0	-2	0	0	0	0	0	-4	0
13	0.58	2.02	1	3	-1	2	-3	3	1	-2	0	3	1	-1
14	-1.33	1.83	-1	-4	-1	0	-2	-4	1	-1	1	-4	0	-1
15	2.67	1.72	3	4	3	-1	0	4	2	3	2	4	3	5
16	-3	1.91	-3	-5	-2	1	-4	-5	-2	-1	-2	-5	-5	-3
17	0.92	1.16	2	2	-1	2	0	2	1	-1	1	2	1	0
18	1.33	2.15	1	-1	1	4	2	-1	4	1	5	-1	-1	2
19	0.25	2.14	2	0	-2	-1	3	0	0	-2	0	0	5	-2
20	-0.5	1.09	-1	1	-2	0	0	1	-1	-1	-1	1	-1	-2
21	1.08	2.84	5	3	-3	-1	1	3	3	-3	2	3	3	-3
22	-0.33	2.06	-2	-2	1	3	-3	-2	2	1	2	-2	-2	0
23	1.25	2.18	0	-1	5	1	4	-1	0	3	1	-1	0	4
24	-0.75	1.29	0	-2	-1	1	0	-2	1	-2	1	-2	-2	-1
25	-2	1.65	-1	-4	0	-4	-1	-4	-2	0	-2	-4	-2	0
26	-1.5	1.98	-2	0	-1	-4	-3	1	-4	-1	-4	1	1	-2
27	-0.5	3.15	-4	2	3	-3	-1	1	-5	4	-5	1	-1	2
28	0.75	1.22	0	1	2	0	0	2	-1	2	-1	2	0	2
29	-2.25	1.48	-5	-1	-3	0	-1	-1	-4	-3	-3	-1	-2	-3
30	0.33	0.78	0	0	1	2	-1	0	0	1	0	0	0	1
31	1.58	2.11	1	-1	3	2	3	-2	2	3	3	-2	4	3
32	-0.08	1.08	-1	1	0	1	1	0	0	0	0	0	-3	0
33	-1.67	2.93	-4	3	-4	-2	-4	3	-2	-4	-2	3	-3	-4
34	-1.58	2.43	-3	2	-3	-1	-5	2	-3	-3	-4	2	-1	-2
35	-0.5	1.17	0	0	-2	-2	1	1	-1	-2	-1	1	0	-1
36	0.58	3.40	3	-3	4	-5	5	-3	0	4	0	-3	2	3

Downloaded by [Universiteit Twente.] at 00:33 17 May 2016

Table 4.1. Interpretation of post-merger values

Characteristic	Post-merger factors			
	1	2	3	4
Characteristic extreme statement +5	We review processes and goals, after a long period. The change is very slow (clan – change style)	We depend on each other to complete a task. We share information and knowledge amongst us (clan – staff climate)	We incrementally change and improve the existing processes. We mind about consistency (hierarchy – change style)	We review processes and goals, after a long period. The change is very slow (clan – change style)
Characteristic extreme statement –5	We rarely have any standardised work processes. In the case of a conflict we resolve it ourselves without seeking formal means (clan – standardisation)	Our leaders are innovators and risk takers. They expect us to take risks and be innovative (adhocracy – leadership)	We are not structured and ordered by rules (adhocracy – communication)	We have undertaken long and difficult standardised professional training (adhocracy – professionalisation)
Distinguishing unique statement (at least 2 point different from others; or only positive or negative)	Our emphasis is on meeting standards and stability. Keeping things the same is important. (hierarchy – strategic emphasis +2)	Our professional training standardisation is very low (clan – professionalisation +3)	Our emphasis is based on people development by investing in knowledge development and community-building (clan – strategic emphasis –1)	Our leaders are co-ordinators, monitors, organisers and rule enforcers. They expect us to follow established rules, policies, and procedures – (hierarchy leadership –1)
Factor interpretation				
‘Hero’	Conservator	Peer-worker	Ruler	Conservator
‘Villain’	External influencer	Risk taker	Chaotic	Ad hoc manager
Dominant orientation	Clan – conservative	Clan – participative	Hierarchy – top-down	Hierarchy – conservative

as factor analysis and principal component analysis. Though Q methodology is sometimes specifically criticised for its lack of statistical rigour due to the legitimate possibility of including relatively few participants (e.g. Danielson 2009), Webler et al. (2009) and Brown (2009) advocate that it is highly suitable for identifying the range and depth of beliefs and values. It is important to note that we did not try to prove the statistical dominance of one value over another, but rather

utilise a sound platform to explore, discover and properly understand the subject matter of staff behaviour and staff values. Hence we can only prove the existence of certain viewpoints or values. (see Watts & Stenner 2012).

Q methodology consists of five steps: (1) identifying the concurrence of values and beliefs; (2) selecting representative statements (‘Q statements’) from this concurrence, and identifying a sample of participants (‘Q participants’) in the domain of this concurrence;

Table 4.2. Interpretation of pre-merger cadastre values

Characteristic	Pre-merger cadastre factors			
	1	2	3	4
Characteristic extreme statement +5	We have undertaken long and difficult standardised professional training (adhocracy – professionalisation)	We depend on each other to complete a task. We share information and knowledge amongst us (clan – staff climate)	We are held together by an emphasis on loyalty, cohesion and tradition. Commitment is very high in our organisation (clan – bonding)	We are held together by an emphasis on loyalty, cohesion and tradition. Commitment is very high in our organisation (clan – bonding)
Characteristic extreme statement –5	Our professional training is rarely standardised (market – professionalisation)	Our leaders are innovators and risk takers. They expect us to take risks and be innovative (adhocracy – leadership)	We have a clear distinction between the lower ranks and the higher ranks. The lower offices execute decisions that are already set and cannot decide (hierarchy – autonomy)	We are not structured and ordered by rules (adhocracy – communication)
Distinguishing unique statement (at least 2 point different from others; or only positive or negative)	Our emphasis is on meeting standards and stability. Keeping things the same is important. (hierarchy – strategic emphasis +3)	Our professional training standardisation is very low (clan – professionalisation +3)	We are not structured and ordered by rules (adhocracy – rules +3)	We review processes and goals, after a long period. The change is very slow (clan – change –3)
Factor interpretation				
‘Hero’	Professional	Peer-worker	Egalitarian	Peer-worker
‘Villain’	Opportunist	Risk taker	Ruler	Independent / autonomous worker
Dominant orientation	Hierarchy – technocrat	Clan – participative	Clan – egalitarian	Clan – entrepreneur

(3) executing a ‘Q sort’, i.e. having Q participants rank and prioritise the statements in a fixed distribution table according to their own insight; (4) executing a factor analysis, usually done with the help of software which can calculate clusters of shared values on the basis of the shared ranks of statements; (5) interpreting the factor analysis with regard to the original research question.

In order to evaluate land administration we first sampled representative statements

from grey (unpublished) literature on mergers, and from preliminary interviews with staff members following the recommended procedure of Watts and Stenner 2012. We sampled and clustered these statements using a conceptual matrix which relates the four culture archetypes (clan, market, hierarchy, adhocracy) with nine cultural attributes (staff climate, communication, bonding systems, leadership, strategic emphases, change style, autonomy of individuals, standardisation of

Table 4.3. Interpretation of pre-merger registration agency values

Characteristic	Pre-merger registration factors			
	1	2	3	4
Characteristic extreme statement +5	Our organisation places its emphasis on achieving the measurable results and markets. Its focus is on productivity (market – strategic emphasis)	We depend on each other to complete a task. We share information and knowledge amongst us (clan – staff climate)	Our emphasis is on meeting standards and stability. Keeping things the same is important (hierarchy – strategic emphasis)	Our leaders are co-ordinators, monitors, organisers and rule enforcers. They expect us to follow established rules, policies and procedures (hierarchy – leadership)
Characteristic extreme statement –5	We have a clear distinction between the lower ranks and the higher ranks. The lower offices execute decisions that are already set and cannot decide (hierarchy – autonomy)	Our leaders are innovators and risk takers. They expect us to take risks and be innovative (adhocracy – leadership)	Our leaders are innovators and risk takers. They expect us to take risks and be innovative (adhocracy – leadership)	We are not structured and ordered by rules (adhocracy – communication)
Distinguishing unique statement (at least 2 point different from others; or only positive or negative)	Our emphasis is on the transformation of resources (adhocracy – change style +1)	We depend on improving standardised procedures which were established long ago. We therefore have low risk (–3)	We are held together by commitment to innovation, experimentation and development (adhocracy – bonding –4)	We review processes and goals, after a long period. The change is very slow (clan – change style –3)
Factor interpretation				
‘Hero’	Customiser	Peer	Conservative	Coordinator
‘Villain’	Single ruler	Risk takers	Risk takers	Improviser
Dominant orientation	Market – profits and customisation	Clan – infocracy	Hierarchy – conservative	Hierarchy – pragmatist

work processes, standardisation of professional training) – this derives 36 statements (Table 1). To derive this specificity of the pre- and post-merger agencies we opted to rely on archetype cultures, and evaluated through Q methodology where in this framework the collective views of individual staff members fitted. If we had only used specific statements relevant to the land administration domain, it

would already entail a preconceived notion of the land administration (merged or non-merged) culture. Instead we had to start from a more basic set of statements, which reflect archetype cultures. The Q samples can then evaluate the degrees to which every participant, and hence the entire population, agrees with each of these archetype cultures. This allows comparison of the change.

We then chose to execute a Q analysis with participants from the land survey agency (Landmäteriet) and the land registry (originally under the authority of the courts).

With the choice of the case and the basic statements in English, each of the 36 statements was put on a separate card. Q methodology uses a specific sample size logic. Watts and Stenner (2005) suggests 'a minimum ratio of 2 participants to every study variable. This implies a minimum ratio of two Q-set items to every participant, or in other words, a Q set that contains twice as many items as you have participants. That means, given a 60-item Q set the study might be judged by 30 participants' (p. 72). In our case we used 36 statements with 19 participants.

Each participant executed one Q sort, meaning each participant was instructed to rank each statement number in the fixed distribution table (Table 2).

With these Q sorts a factor analysis could be executed, using PQ software.² Unlike R analysis Q analysis does not derive factors on respondents (deriving clusters of respondents with similar characteristics), but on the statements (clusters of beliefs with similar views and preferences). As a consequence each factor represents a comprehensive belief, composed of a set of shared and connected values and beliefs among a certain sample of participants. Comparing the factors from before the merger with those after the merger thus reveals a shift in values and beliefs, and hence the shift in corporate culture as a consequence of the merger.

5. Results of Q sorts and associated inter-views

In total 16 staff members from the Swedish land administration agency (Landmäteriet) and the registers participated in the Q sorting and in personal interviews, which took place in October–November 2012. These staff members represented how the post-merger culture

would be. The pre-merger Q sorts relied on three additional experts, who were knowledgeable of the 'typical' survey organisation prior to a merger, the typical register organisation prior to a merger, and the typical merged culture respectively. This protocol with few participants is valid according to Watts and Stenner (2012), who even refer to one-participant Q research designs, if the participant is a representative from a particular corporate culture. Stergiou and Airey (2010) state furthermore that 'in small sample Q studies the number of statements is a function of the individuals taking part in the study and hence the statements can be twice the number of the individuals' (p. 315). Fewer participants yield quality on the outcome, which is finding the existence and breadth of beliefs, rather than the statistical dominance of one belief over another. The consistency and pattern can still be detected even though the breadth of views might be limited (Watts & Stenner 2012). Therefore, the relatively limited number of participants was still considered valid.

The executed Q sorts can be clustered using the factor analysis into four factors for the pre- and post-merger (Muparari 2013). Table 3 shows these clusters. The factors are derived with a factor analysis focusing, ranking the numbers of the statements and calculating the variation with which statements are ranked on a scale of -5 to $+5$. The numbers in Table 3 reflect the degree of agreement with each of the statements. A single factor thus reflects a coherent belief system, which can be described by the degree to which it agrees or disagrees with each statement (represented by the rank from -5 to $+5$). The combined ranks constitute the coherent belief system of the factor. Each factor also covers a coherent set of variation in the responses of the Q participants. Thus, looking at the differences between factors helps to understand the co-existence of different values and beliefs.

Specifically, the numbers (ranging from -5 to $+5$) represent the degree of agreement

with a particular statement. Each of the four factors represents the major cluster of values of beliefs. So for example factor 1 in the post-merger represents a belief which agrees significantly (value is 4) with statement 1, which is 'We depend on each other to complete a task. We share information and knowledge amongst us' and disagrees completely with statement 29 (value is -5). The average value in the first column is an average agreement with each statement, including both post- and pre-merger, while the standard deviation represents the degree to which participants have agreed on a given statement. A note of warning with these values is that one cannot attach a proportional value of number of participants believing a certain factor, but the significance lies in the degree to which each factor explains the variation in beliefs among interviewed participants. In other words, the factors are not a representative sample for all participants, but they embody a representative sample of the variation of existing beliefs and values among participants. As a result, factor 1 of the post-merger cannot be compared directly to factor 1 of the pre-merger, but it can be said that factor 1 is closest to the shared beliefs and values among the interviewed participants.

A first inspection of the Table 3 reveals that all factors of both post- and pre-merger score positive values on statement 1, which represents a clan staff climate, and statement 9, which represents the clan bonding systems. Contrastingly, all factors score negative or zero values on statement 4, representing the adhocracy staff climate. Most factors seem indifferent (score of 0) to statement 12, adhocracy bonding system. The biggest disagreement (i.e. the highest standard deviation) is on statement 36, the adhocracy view on professional standards. Overall this suggests that there seems to persist an inclination towards a clan corporate culture, and a rejection of the adhocracy type of corporate culture. This is, however, a very general first observation.

The next step is an interpretation of the individual factors and a differentiation between post- and pre-merger. This can be further based on four major characteristics for each factor:

1. Characteristic extreme statements (e.g.+5/-5).
2. Distinguishing statement (unique to that factor – at least 2 points different from others, or only positive or negative as compared to other factors).
3. Factors interpretation using the metaphors 'hero' (what/who is considered good), 'villain' (what/who is considered bad)
4. Relation to four culture archetypes (clan, market, hierarchy, adhocracy) with nine cultural attributes (staff climate, communication, bonding systems, leadership, strategic emphases, change style, autonomy of individuals, standardisation of work processes, standardisation of professional training)

Tables 4.1, 4.2, and 4.3 provide a summary of the interpretation for each factor, and compare the factor results between the post-merger and the pre-merger states. The factor characteristics and the dominant orientation were interpreted based on the extreme and distinguishing statements. Factor 1 can act as an example of how this interpretation was done. First of all, the main preferential statement is statement 21, a statement which emphasises a reluctance to change. This is complemented by the most distinguishing statement, 19, which stresses the preference for standards and preservation of such standards. In contrast the factor dislikes statement 29, which would emphasise more informal, hence changeable, work processes. Overall, this shows a high preference for conservation and a dislike of change. This dislike of change also implies a dislike of external change drivers. Therefore factor 1 of the post-merger can be characterised as having a clan (internal) orientation, with

conservative and hierarchical tendencies. This label is a classification which would best describe the combination of statement preferences within the coherent belief system related to a single factor.

For the other factors a similar process of interpretation took place, resulting in the completion of Tables 4.1, 4.2, and 4.3.

6. Discussion on shifts in corporate culture after merger

The above-mentioned characteristics indicate culture change from pre-merger to post-merger, and also shed some light on the origin of the post-merger cultural values.

First of all, we could interpret the pre-merger values depicted through Tables 4.2 and 4.3 as highlighting a considerable pride of staff members in their work environment. Given the dominant clan orientation and internal participation (especially in the pre-merger cadastre) staff seemed to feel comfortable with their working environment, and liked to see their internal culture preserved and prolonged. Internal rules are set through personal internal contacts rather than through hierarchical means. Work processes were predominantly technocratically determined, derived from the feeling that the technical expertise (in the case of the cadastre) and the legal expertise (in the case of the register) were so specific that no external staff member could judge these. The pre-merger staff members also disliked adhoc-racy leadership or improvisation, hence paid high value to professionalism.

The pre-merger cultures of the cadastre (Table 4.2) and register (Table 4.3) are very different in the breadth of existing values and beliefs. Whereas within the cadastre the pre-merger culture was much more homogeneous in terms of loyalty towards peers, in the register there existed both hierarchical, peer and customer preferences. One obvious explanation for this difference is that in the registration process there is much more inter-

action with customers than in the surveying or mapping process. This would make the registration officers more aware of customisation needs, which would then transmit to the overall behaviour and values of registration staff. A possible additional explanation could be the location at which registration or cadastral surveying takes place, as surveying is much more conducted in the field, and registration much more within offices.

With regard to the post-merger (Table 4.1), surprisingly – given the frequently quoted egalitarian Swedish culture (Trägårdh 1990; Holmberg & Åkerblom 2007) – the culture seems to have become more focused on hierarchical rule setting and rule compliance (hence more emphasis on control) than before the merger. The dominant orientation in the four factors is either clan or hierarchy, with a tendency toward conserving the internal culture and work processes at the expense of pride in the organisation. The work processes become more important than the social work environment. One could say that staff have become more alienated from their workplace, and work has become less social or personal. The existence of pragmatism (factor 4 in the pre-merger registration culture) has vanished completely in the post-merger. There is more compliance with rules, and there are clear negative feelings about chaos and adhoc-racy.

The shifts towards valuing rules and stricter compliance at the expense of valuing egalitarianism (at the cadastre) and pragmatism (in registration work) may reflect a process of seeking a ‘soft solution’ in bridging the existing pre-merger differences. It is a soft solution because the differences are not solved by clear incentives or sanctions, but by an invisible process of interactions which somehow shift the overall values. Enacting the values resulted in the change towards valuing more rules and stricter compliance. The existence and value of seeking a ‘soft solution’ itself are perhaps also clear proponents of both the pre-merger and post-merger corporate culture.

The decrease in importance of personal work relations may have been rooted in the market and customer orientation which existed in the register. The recognition that the work cannot be excluded from the external environment also implies that work has to become more objectified (i.e. less subject to personal discretions, for example). This objectification must at the same time also have caused hesitation to adapt for the cadastre staff. An additional explanation for the objectification of work procedures may be that the cadastral work has changed from predominantly field work to increasingly more office work. This would instil more office/bureaucratic rule compliance at the expense of more clan-oriented, colleague peer-pressure.

7. Conclusion

The main research question, what can a corporate culture perspective contribute to the dilemmas, problems and solutions when land administration agencies consider pursuing a merger between the cadastral (mapping and recording of boundaries) agency and the registration (or recording and/or determining of rights) agency, arose in an international technocratic era which assumes an unproblematic process of mergers in view of efficiency gains and information integration.

The results and discussion sections have shown that a corporate culture perspective is useful to understand the origin of behavioural changes or resistance that may occur after a merger. With Q methodology it became clear that within a single organisation multiple views and values co-exist. Each of these value systems of staff members contributes to the overall corporate culture of an entire organisation. When two organisations merge, then it creates a melting pot and a new set of interactions of such multiple value systems, which in turn leads to a new set of multiple values.

In the pre-merger cadastre the corporate culture seemed much more homogeneous than

in the pre-merger registration agency given that the breadth of views seemed much smaller. Most factors favoured the use of technological means and associated rules and technical professionalism. In contrast, within the registration agency staff members had additional attention to values which emphasised more customisation and client orientation.

The use of Q methodology proved valuable in deriving and highlighting that multiple values co-exist. A possible misunderstanding of using Q methodology is indeed that the statistical values do not translate to a statistical representation of a specific group within an organisation. This implies that the factors cannot be presented or explained as statistically representative samples of all staff members (such as 50% of the people adhere to a particular view). This could, however, be the next step of research. What this research did highlight, however, was the description of the landscape of co-existing views rather than the influence of separate views or the number of followers of views. The mere fact that a coherent view exists has an influence in actual work practice, even when the view can only be linked to a single person.

The results of this study could be further complemented when adding more participants in the Q surveys, although it is expected that this will not significantly alter the breadth of views. A crucial difference may, however, arise when comparing views from staff members from other countries where the agencies merged or where the agencies did not merge. Such a comparison would show whether the factors of the land administration domain are consistent or not, and whether the shifts before and after the merger are consistent or not. While the findings are of a more qualitative nature, and represent a first attempt at this, this article is innovative in the way it has approached the merger of cadastres and registries, namely from a corporate culture perspective, and using Q methodology. This itself is new to the scientific community of geo-in-

formation sciences, surveying and land registration. We did not anticipate any practical organisational recommendations at this stage for the Swedish land agency or for other land agencies. We only proved that at this stage it would be wise for executive staff members of land agencies to start looking more closely at the diversity of values and beliefs which still exist among their staff members. Given that values and beliefs may be persistent and persuasive, even though they may be rooted in older work conventions and traditions, they may at some point in time translate into actions and influence certain future strategic organisational decisions.

Notes

1. <http://www.unece.org/index.php?id=32021>
2. PQ Software and its documentation is freely available at the website <http://schmolck.userweb.mwn.de/qmethod/downpqwin.htm>

References

- Bogaerts, T. and Zevenbergen, J., 2001. Cadastral systems – alternatives. *Computers, Environment and Urban Systems*, 25, 325–337.
- Boyne, G., Martin, S. and Walker, R., 2004. Explicit reforms, implicit theories and public service improvement. *Public Management Review*, 6, 189–210.
- Bronislovas, M., 2010. Country report 2010, Lithuania (Based on the PCGIAP-Cadastral Template 2003). <http://www.cadastraltemplate.org/lithuania.php> (last date of access 20 December 2015).
- Brown, S.R., 2009. Q Technique, method, and methodology: Comments on Stentor Danielson's article. *Field Methods*, 21, 238–241.
- Çagdas, V. and Stubkjær, E., 2009. Doctoral research on cadastral development. *Land Use Policy*, 26, 869–889.
- Cameron, K.S. and Freeman, S.J., 1985. *Cultural congruence, strength, and type: Relationships to effectiveness*. School of Business Administration: University of Michigan.
- Cameron, K.S. and Quinn, R.E., 2011. *Diagnosing and changing organizational culture: Based on the competing values framework*. Revised ed. Reading, Massachusetts: John Wiley & Sons.
- Carroll, G.R. and Harrison, J.R., 2002. Come together? The organizational dynamics of post-merger cultural integration. *Simulation Modeling Practice and Theory*, 10, 349–368.
- Chatterjee, S., Lubatkin, M.H., Schweiger, D.M. and Weber, Y., 1992. Cultural differences and shareholder value in related mergers: Linking equity and human capital. *Strategic Management Journal*, 13, 319–334.
- Cuppen, E., Breukers, S., Hisschemöller, M. and Bergsma, E., 2010. Q methodology to select participants for a stakeholder dialogue on energy options from biomass in the Netherlands. *Ecological Economics*, 69, 579–591.
- Danielson, S., 2009. Q method and surveys: Three ways to combine Q and R. *Field Methods*, 21, 219–237.
- Deal, T.E. and Kennedy, A.A. 1992. *Corporate cultures: The rites and rituals of corporate life*.
- ELIKOS, E., 2010. Country report: Cyprus ((Based on the PCGIAP-Cadastral Template 2003). Available from: <http://www.cadastraltemplate.org/countryreport/Cyprus-14Sept2010.pdf>.
- ERNST, H., 2001. Corporate culture and innovative performance of the firm. Management of Engineering and Technology, . PICMET'01. Portland International Conference on, 2001. IEEE, 532–535.
- De Graaf, G. and Van Exel, J., 2008. Using Q methodology in administrative ethics. *Public Integrity*, 11, 63–78.
- Herzog, P., 2008. *Open and closed innovation: Different cultures for different strategies*. Wiesbaden: Gabler.
- Hill, S., 1990. Technology, corporate culture, and the insurance industry: The Australian experience. *Technology in Society*, 12, 11–25.
- Hofstede, G., Neuijen, B., Ohayv, D.D. and Sanders, G., 1990. Measuring organizational cultures: A qualitative and quantitative study across twenty cases. *Administrative Science Quarterly*, 35, 286–316.
- Holmberg, I., and S. Åkerblom. 2007. "Primus inter pares" leadership and culture in Sweden. Chapter 3. In *Culture and leadership across the world. The GLOBE book of in-depth studies of 25 societies*, edited by J. S. Chhokar, F. C. Brodbeck and R. J. House. New York: Taylor & Francis, pp. 33–74.
- Kaufman, J. and Steudler, D. 1998. Cadastre 2014, A vision for a future cadastral system. FIG working group 1 Comm. 7. FIG Publication no. 61, 48 pages, available at <https://www.fig.net/resources/publications/figpub/pub61/Figpub61.pdf> (last date of access 20 December 2015).

- van der Molen, P., 2010. County Report: Netherlands (Based on the PCGIAP-Cadastral Template 2003). Available from: <http://www.cadastraltemplate.org/countryreport/Netherlands-7Sep2010.pdf>.
- Muparari, T.N., 2013. *Evaluation of mergers of cadastral systems : A corporate cultural perspective*. Enschede, Netherlands: University of Twente Faculty of Geo-Information and Earth Observation (ITC).
- Österberg, T., 2003. Country report: Sweden (Based on the PCGIAP-Cadastral Template 2003). Available from: <http://www.cadastraltemplate.org/countryreport/Sweden-5Dec2003.pdf>.
- Silva, M.A., 2005. *Modelling causes of cadastral development – cases in Portugal and Spain during the last two decades*. Ph.D. Dissertation. Aalborg, Denmark: Aalborg University.
- Stergiou, D. and Airey, D., 2010. Q-methodology and tourism research. *Current Issues in Tourism*, 14, 311–322.
- Stuedler, D., Williamson, I., Kaufman, J. and Grant, D., 1997. Benchmarking Cadastral Systems. *The Australian Surveyor*, 42, 87–106.
- Trägårdh, L., 1990. Swedish model or swedish culture? *Critical Review*, 4, 569–590.
- Vrakking, W.J., 1985. Revamping organisations through cultural interventions. *Journal of management consulting*, 10–16.
- Watts, S. and Stenner, P., 2005. Doing Q methodology: theory, method and interpretation. *Qualitative Research in Psychology*, 2, 67–91.
- Watts, S. and Stenner, P., 2012. *Doing Q Methodological Research : Theory, Method and Interpretation*. London: Sage publications.
- Webler, T., Danielson, S. and Tuler, S., 2009. *Using Q method to reveal social perspectives in environmental research*. Greenfield MA: Social and Environmental Research Institute.
- Williamson, I.P. and Ting, L., 2001. Land administration and cadastral trends – a framework for re-engineering. *Computers, Environment and Urban Systems*, 25, 339–366.
- Yomralioglu, T., 2003. Country report: Turkey (Based on the PCGIAP-Cadastral Template 2003). Available from: <http://www.cadastraltemplate.org/countryreport/Turkey-3Nov2003.pdf>.
- Zaheer, S., Schomaker, M. and Genc, M., 2003. Identity Versus Culture in Mergers of Equals. *European Management Journal*, 21, 185–191.
- Zevenbergen, J., 2002. *Systems of Land Registration, Aspects and Effects*. PhD, Technical University Delft.