CDA

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Oil & Gas UK

The business value case for data management - a study

Related Literature

Schlumberger

Background

Common Data Access Limited (CDA) is a not-for-profit subsidiary of Oil & Gas UK, the leading representative body for the UK offshore oil and gas industry.

During 2010 CDA commissioned Schlumberger to study the 'Value of Data Management'. This study included interviews with senior executives, a search of related literature, a roundtable meeting and a variety of other inputs all designed to illustrate the high value of Data and Data Management to working exploration and production companies.

In the course of the study input was provided by staff at CDA, Schlumberger and a wide range of other organisations. In particular the authors would like to thank staff from the following organisations for providing invaluable insights:

Apache	BG	BP	Centrica	Chevron
ConocoPhillips	Dana Petroleum	DONG Energy	EnQuest	Fairfield Energy
First Oil	Ithaca	Noreco	NPD	Petoro
Premier Oil	Shell	Talisman Energy	Total	UK DECC

This is the "Related Literature" document. It is one of the four documents delivered by the study:

Results	Roundtable	Related Literature	Process
The value that data management and data deliver to E&P companies	A discussion held between senior oil executives about data management	A survey of the documents about the value of data in the oil industry	A description of the process that was followed during this study

All four can be downloaded from the Oil & Gas UK web site at:

http://www.oilandgasuk.co.uk/datamanagementvaluestudy/

About the authors

Steve Hawtin joined Schlumberger in 2001 where he has consulted on a wide range of Information Management engagements. For more than 10 years before that Steve worked for Oilfield Systems Limited where, as Technical Director, he was responsible for the creation of products such as GeoScene, DAEX and Quadrate.

David Lecore has worked in the Oil and Gas industry for 25 years, working initially for major operators and then joining Schlumberger in 1997. David's work in Schlumberger has focused on both Information Management and Knowledge Management, concentrating on the governance, process, strategy and value aspects as opposed to technology solutions.

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Published material

A significant amount of literature exists on all the key issues related to the oil and gas industry, this is in the form of published papers and conference proceedings from a range of societies and other sources. Some of this material is related to Data Management; however, considering the longevity, the complexity and the impact of data management related issues, the volume of this literature is relatively small.

There are many excellent conferences and journals that focus specifically on data management in the oil industry[1], for a variety of reasons these tend to be by, and for, E&P data managers. This means that the budget holders and data users are not involved in these discussions and are often unaware of them. In order to reflect the non-specialist's view of the subject this survey of related literature deliberately ignored the many sources that specialise in covering data management issues.

A number of oil industry consolidated sources, professional societies and libraries were accessed. These included OnePetro[2], the Lyell Collection[3] and personal collections. The authors have unlimited access to millions of articles from many of the leading societies, journals and publishers relevant to our industry. While a number of interesting and informative items were identified in these sources, very few provided insight into data management issues, in particular, very few discuss the 'value' of data management especially considering how important it is to E&P projects. The most interesting articles have been listed later in this document.

When petrotechnical societies do cover data management it is often in isolation, for example the SPE have a separate group that covers digital energy and when in 1995 the Geological Society covered data management is was in a special publication written by and aimed at data managers.

This isolation has two negative impacts, first of all the managers and budget holders are uninformed about potential opportunities to improve making it more challenging to create convincing business cases. Secondly the data managers themselves are less familiar with the key concerns of those holding the budget.

However there is some evidence that awareness of data management is growing within the wider E&P communities. The "Trends in phrases used" section in this paper explains the evidence that "data governance", "data ownership" and "data quality management" are currently amongst the fastest growing terms within the literature.

[1] For example, Petroleum Network Education Conferences (PNEC) are held in the spring of each year in Houston, the Expert Center for Information Management (ECIM) hold an annual conference in Norway, the Professional Petroleum Data Management Association (PPDM) publish a wide range of information and the Oil Information Technology Journal (OilIT) publishes a monthly newsletter

[2] OnePetro.org is a multi-society library that provides access a broad range of technical literature related to the oil and gas exploration and production industry, not least the Society of Petroleum Engineers and World Petroleum Congress. The site indexes more than 85,000 E&P related documents.

3 Launched in 2007 to celebrate 200 years of the Geological Society of London, the Lyell Collection is an online collection comprising of the Society's journal titles, Special Publications and key book series containing more than 18,000 items

Notable Papers

This list of papers, from general oil industry sources, provides an introduction to the state of the literature. These papers include material that the authors found valuable, historical references that illustrate the level of progress over the last few decades and some papers that present contrasting views that the authors would disagree with:

1. Arango, G., Colley, N., Connelly, C., Greenes, K., Pearse, K., Denis, J. and Highnam, P. (1997) 'What's in IT for Us?' in Oilfield Review Autumn 1997

2. Balough, S., Betts, P., Breig, J., et al (1994) 'Managing Oilfield Data Management' in Oilfield Review Jul 1994

3. Bamford , D. (2009) 'Everybody needs digital technology - but only if it works' in Digital Energy Journal Jun 2009

4. Brown, D.A., Allen, L.R. and Neff, D.B. (1994) 'Teamwork and Technology: Successful Reservoir Management' WPC26150 presented at 14th World Petroleum Congress

5. Dardon, S., Gillespie, J., Geist, L., King, G., Guthery, S., Landgren, K., Pohlman, J., Pool, S., Simonson, D., Tarantulo, P.Jr. and Turner, D. (1992) 'Taming the Geoscience Data Dragon' from Oilfield Review Jan 1992

6. Duller, P.R. (1995) 'The quality assurance of geological data' from Giles, J. R. A. (ed.) 1995, Geological Data Management, Geological Society Special Publication No 97

7. Dunn, M.D. (1992) 'A Method To Estimate the Value of Well Log Information' SPE24672 presented at the SPE Annual Technical Conference and Exhibition

8. Fattshi, B. and Okita P.J. (1994) 'Management of a Declining Field' SPE28341 presented at the SPE 66th Annual Technical Conference and Exhibition

9. Garbarini, M., Catron R.E. and Pugh, R. (2008) 'Improvements in the Management of Structured and Unstructured Data' IPTC12035 presented at the International Petroleum Technology Conference 2008

10. Hawtin, S., Abusalbi, N., Bayne, L. and Chidwick M. (2002) 'The Data Integration Spectrum' presented at AAPG Cairo 2002

11. Kozman, J.B. (2005) 'Data on Demand: The Emerging Business Case' SPE93625 presented at 14th SPE Middle East Oil & Gas Show and Conference

12. Kozman, J.B. (2008) 'The Value of Data in Multiple Repositories' SPE118451 presented at SPE Gulf Coast Section Digital Energy Conference and Exhibition

13. Kozman, J.B. and Gimenez L. (2004) 'Maturity Models for E&P Data and Information Management Organizations' SPE88666 presented at Abu Dhabi International Conference and Exhibition

14. Lowe, D.J. (1995) 'The geological data manager: an expanding role to fill a rapidly growing need' in Geological Society, London, Special Publications 1995

15. Marechal, A. and Robert, A. (1998) 'The Road to Information Management in the Oil Industry' from 15th World Petroleum Congress

16. Marks, L. (2008) 'IT Doesn't Matter - Or Does It?' from SPE: Journal of Petroleum Technology Dec 2008

17. Miller, R.G. and Gardner, J.S. (1995) 'Geoscience data value, cost and management in the oil industry' in Geological Society, London, Special Publications 1995

18. Neri, P. (2010) 'Data Management important when choosing software' in Digital Energy Journal Dec 2010

19. Smith, A.H. (2002) 'The Economic Advantages of Managing Data, ONCE!' SPE78337 presented at the SPE European Petroleum Conference

Trends in phrases used

In addition to using the OnePetro site to identify particular articles of interest it was decided to analyse the terms being used on it, in particular to identify terms that are being used more frequently. In order to do this the number of items returned for each year from 1980-2010 for a given search term was noted. The number of references returned can be used as an indicator of how prevalent that phrase was for periods of the past.

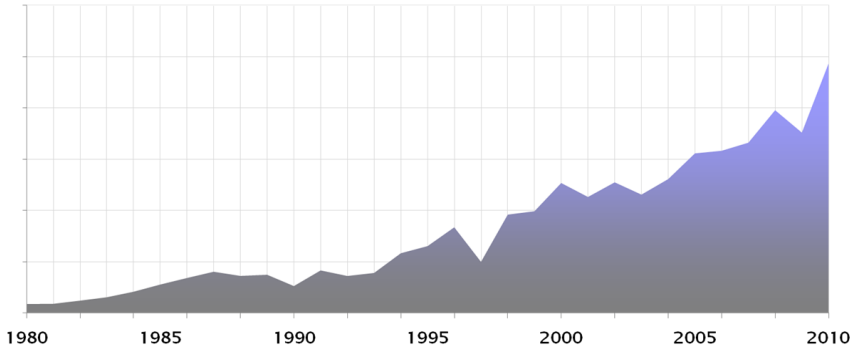

Figure 1: The number of available items grew from 1980 to 2010

Of course the number of items held by OnePetro grew considerably over the period examined, so the raw counts cannot be used. In order to ensure that each year's results could be compared the values were scaled by a factor estimated from the average number of items returned for a range of search terms.

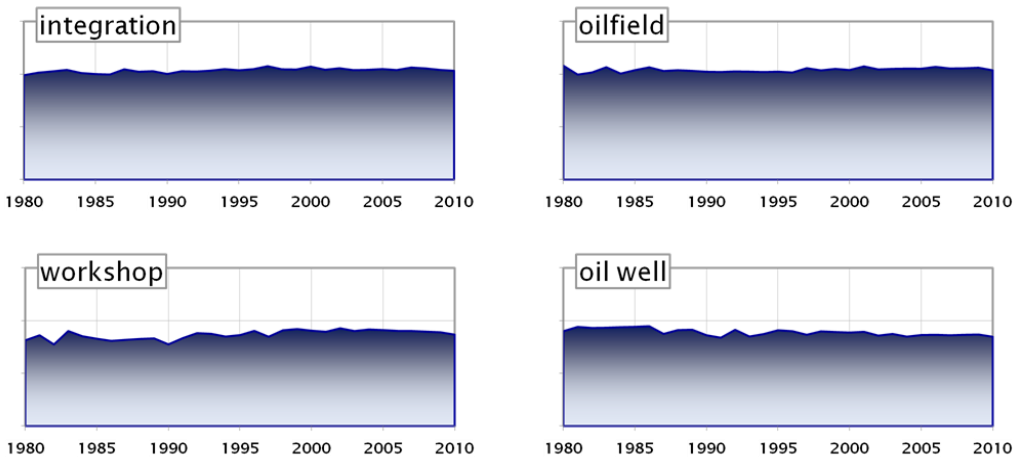

Figure 2: Demonstrating that normalisation functions correctly

In order to check that this correction factor has the desired effect it was tested with a number of generic terms that would not be expected to vary greatly in popularity over the period in question. The plots above show the profiles over the time period for some general terms.

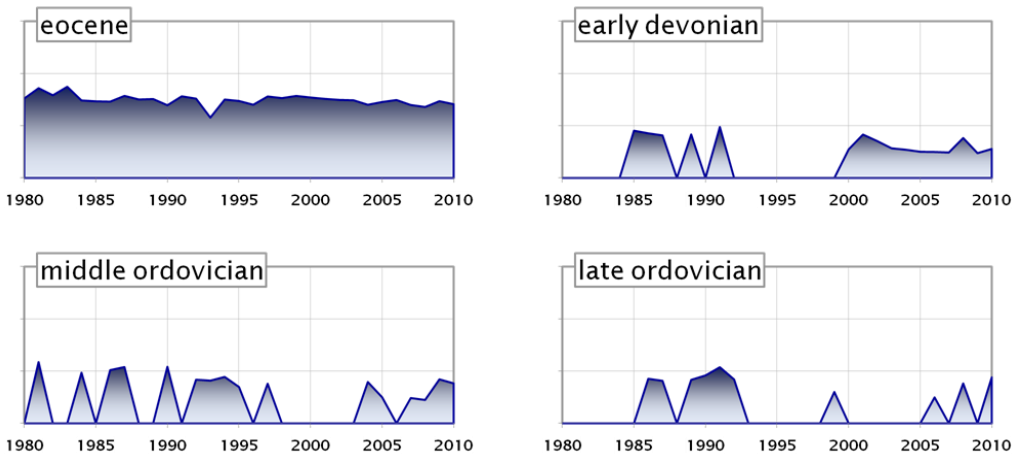

Figure 3: Historic frequency of papers containing geological terms

The names of geological time periods are one good example of a set of terms that are unrelated to data management and whose frequency varies over the time period. For example if particular formations are depleted, or if new plays are tied to chronology.

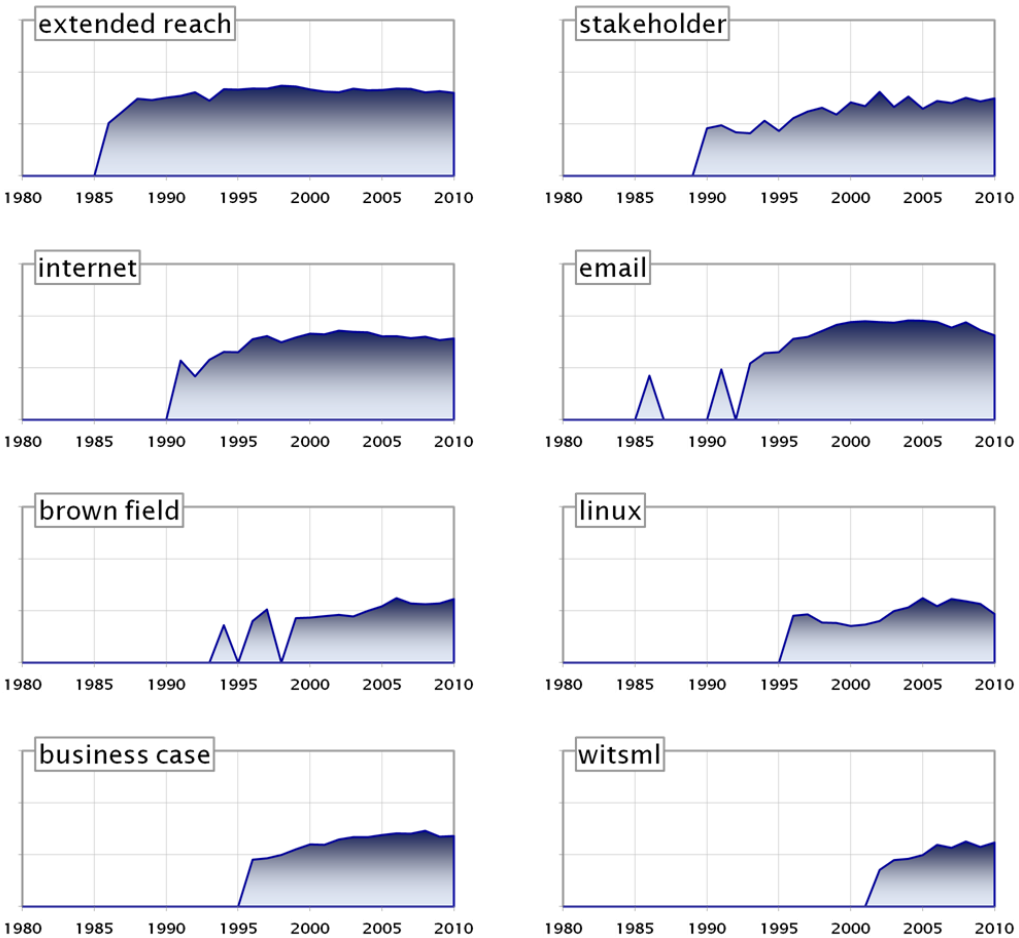

Figure 4: Some terms have clear introduction points

There are some terms, unknown in 1980, that currently are widely used. The frequency plots of these terms shows the point in time where they were first introduced and how they have maintained interest since that time.

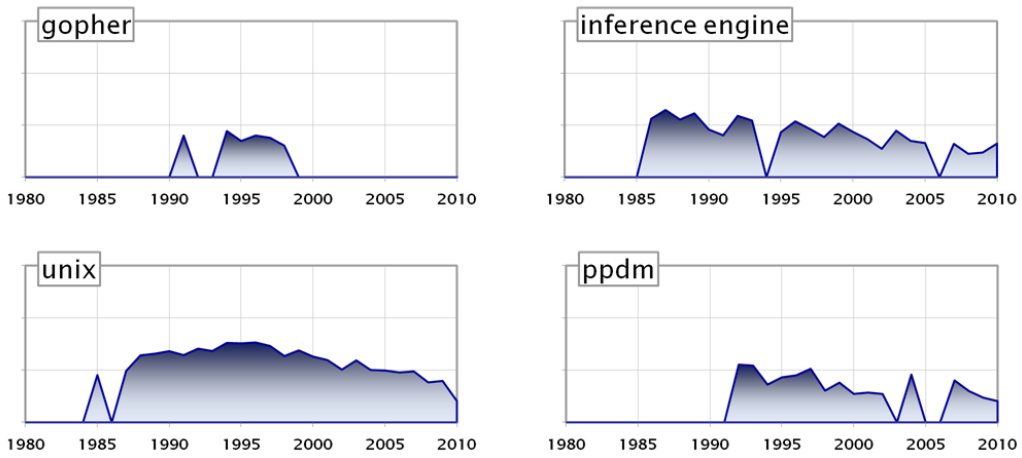

Figure 5: Some terms illustrate recent declines in usage

Other terms, particularly those related to particular technologies or techniques show clear indications of both their introduction and subsequent decline in usage.

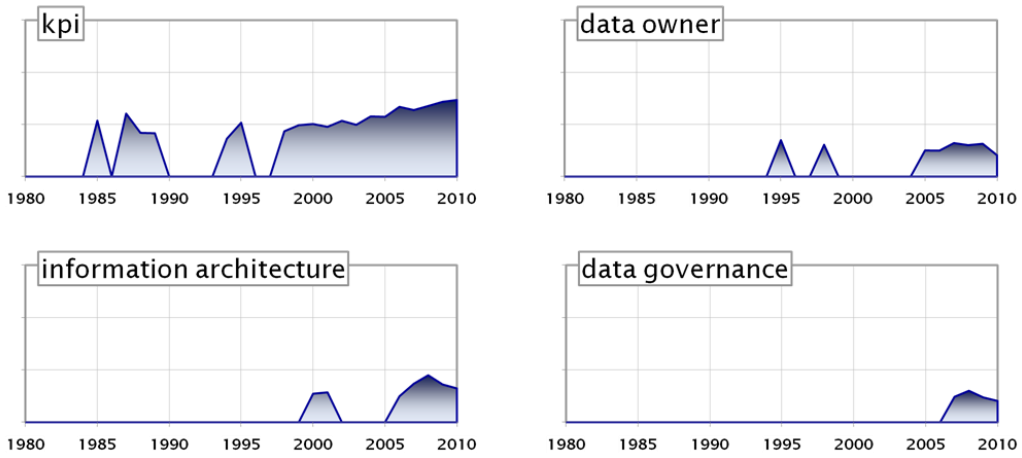

Figure 6: Terms that have an upward trend over the last 10 years

When the results are analysed to reveal the terms that have the strongest growth over the last 5 years terms, such as "witsml", "middle ordovician" and "KPI" are amongst the most prominent. Within the top terms an unexpectedly high number of data management related terms seem to be at the beginning of significant growth in usage.

Terms such as 'data governance' are now being adopted, past papers have covered these topics without necessarily using the specific term 'data governance' for example a much quoted model was presented in 1992[4] and could easily be put forward today as a framework on which to found a data management strategy. However the use of a common language within the industry to discuss and debate these topics is an important requisite. So if we have been discussing data management issues for so long, even outside of the data management domain, in places such at the SPE and at least some show that they have an understanding of the problem, why have we not progressed further? Is it that not all those that need to help are listening? Other vital terms such as 'data ownership' seem to have struggled to emerge but have more recently gained traction.

[4] Feineman, D. "Data Management: Yesterday, Today and Tomorrow" (1992) presented at PETEX '92 Conference London

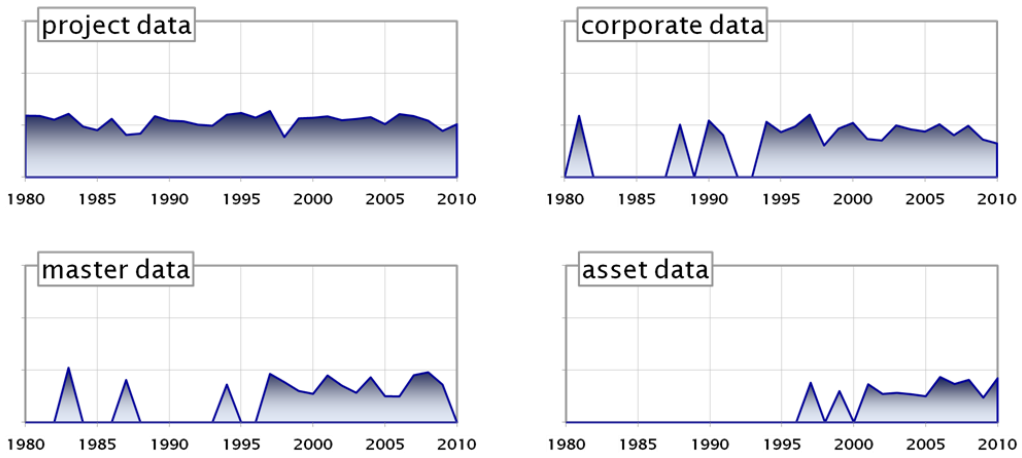

Figure 7: Roles that data plays in the corporation

The different roles that data plays have distinct profiles, "project data" has been the most used form ever since 1980. The terms "master data" and "corporate data" which both became prominent in the 1990s now seems to be in decline. The emerging term seems to be "asset data", perhaps a recognition that data belongs to the asset?

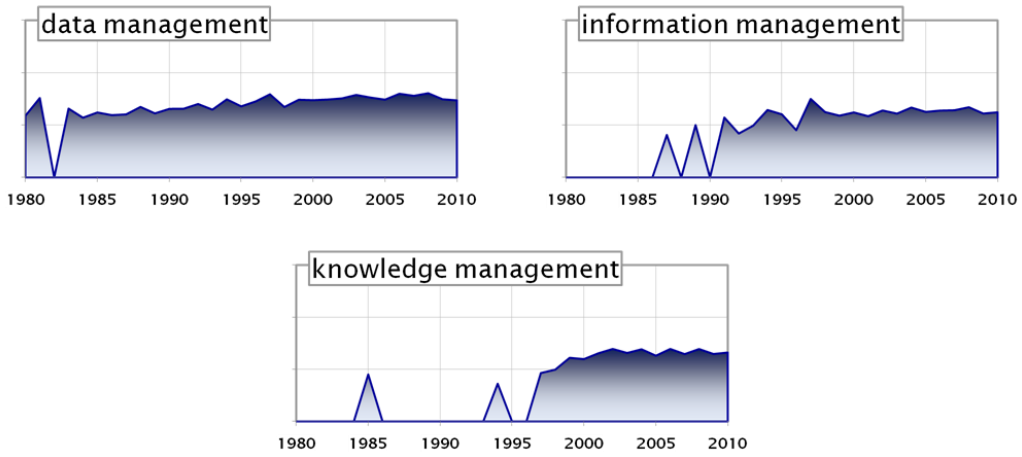

Figure 8: Differences between Data, Information and Knowledge

It is also interesting to note that while "data management" has been prominent since 1980, the term "information management" did not emerge until the late 1980s and "knowledge management" became prominent in the late 1990s.

Summary Plot

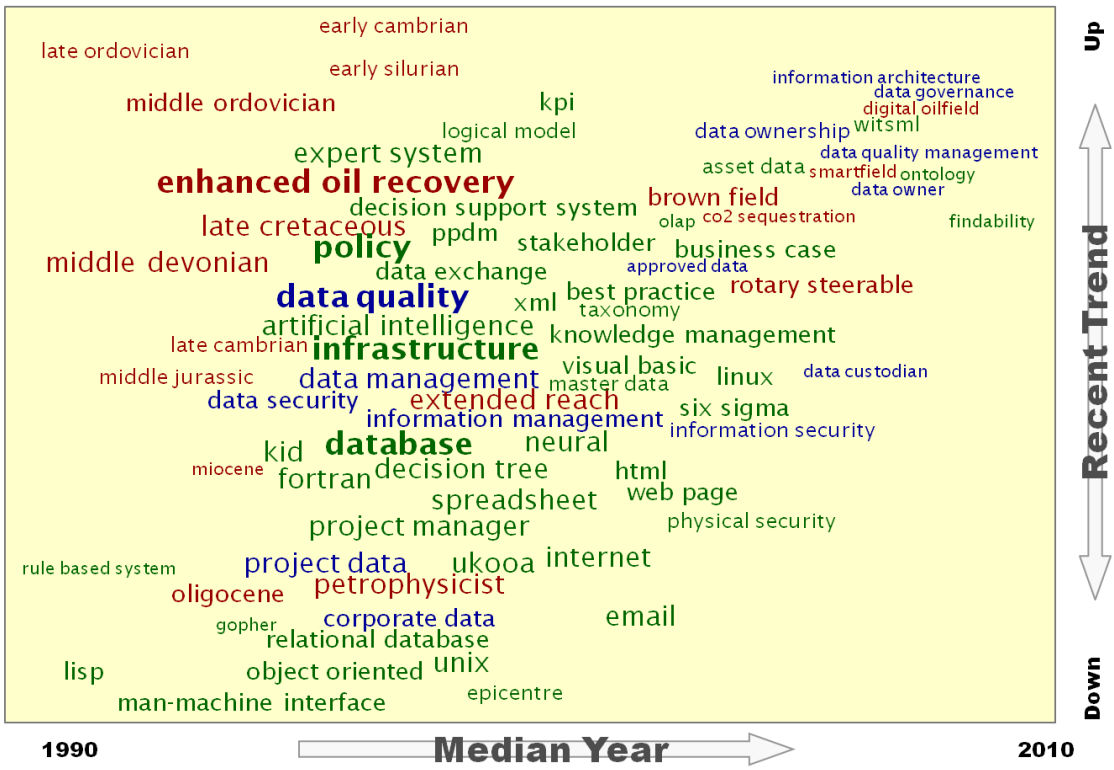

Figure 9: Summary of trends for terms in OnePetro

It is interesting and informative to see how the use of different individual terms has waxed and waned over the last three decades. However to provide a more holistic view the trend for each search term has to be summarised in some way. In the plot above the horizontal position is determined by the median year that results were returned, so for a term like "data management" which was fairly consistently used from 1980-2010 the median year was 1996. The vertical position was determined by the trend over the last five years.

This plot demonstrates the fact that many of the terms that have recently been introduced and are growing most strongly are related to data management. A concerted effort was required even to uncover the few geosciences terms that fell into the same region.