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THE DATA VALUE MAP: A FRAMEWORK FOR DEVELOPING SHARED UNDERSTANDING ON DATA INITIATIVES

Completed Research Paper

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Abstract

While organisations regularly claim that data is one of their most important assets, they regularly fail to articulate or fully leverage its value. This leads to impacts such as missed opportunities, a reactive nature to data issues, and poorly defined/failed data projects. Framing this problem as a lack of shared understanding and misalignment between data stakeholders, this paper documents the development of the Data Value Map, an artefact designed to remedy this disconnect. Following a Practitioner Design Science Research approach, the Data Value Map is currently in its fourth iteration and has been rigorously evaluated with: (i) 96 practitioners in the field, (ii) a 12-month case-study, (iii) feedback from six workshops, and (iv) a survey on the effectiveness of the framework. Developed over the course of 4 years the Data Value Map has demonstrated its ability to facilitate a shared understanding on data initiatives and is linked to the success of data projects with an estimated value over €40 million. While, the Data Value Map is itself a contribution to the body of knowledge, further contributions were made in the form of: insights on how to overcome barriers in developing a shared understanding, namely: a lack of an organisational mental model, (ii) lack of a shared language, and (iii) an over-emphasis on technology.

Keywords: Data Value Map, Design Science Research, Business Value.

1 Introduction

Underpinning this research is a problem that originated from observing the difficulty organisations have in clearly communicating and deriving value from specific data initiatives. While this may go against the perceived strategic importance of organisational data, it is in line with the view that for many businesses, data is a by-product of their operational model and business strategies do not ‘reflect and exploit data’ (Lee et al. 2014, p.3). Indeed, the issue has not gone unnoticed, with the resulting trend of “Chief Data Officers” being employed to fulfil a mandate that includes priorities such as: identifying and communicating the business value of data, and championing the measurable value of an organisation's data assets” (Duncan et al. 2016). However, this trend is just starting and only some organisations have realised that data problems can reflect weaknesses in business strategy and operations” as “seemingly tedious data problems are often fundamentally business problems” (Lee et al. 2014, p.2). It is also worth noting that these data problems are not a new phenomena. Issues such as: data silo’s, data quality and data governance have long been known and studied. Yet, when it comes to

building the business case/communicating the value of initiatives to solve these problems, difficulties arise (Fisher, 2009).

This paper frames these difficulties within the context of shared understanding. Shared understanding is viewed as a key component of IS/IT alignment, an essential enabler for value realisation. More specifically it impacts on both the social (Reich and Benbasat 2000) and intellectual factors involved in alignment (Luftman and Kempaiah 2007) by facilitating closer working business/technology relationships and a foundation for clear communication. Unfortunately, developing a shared understanding is not just a once off task. Continual change in business environments coupled with advances in technology ensures the task of developing a shared understanding is never finished and the disconnect between business and technology stakeholders will always exist (Agarwal et al. 2009). As with IS/IT initiatives the need to develop a shared understanding for data initiatives is just as strong if not stronger. Not only do data initiatives have a business/technology divide (in the form of data creators and data users) , there is also a tendency for technology stakeholders to be given responsibility for organisational data assets resulting in issues, such as: the inability to separate data from technology assets, or inability to permanently fix data problems as they are embedded in the business side not technology (Redman 2013).

In this article, we present a framework (Data Value Map) to facilitate a shared understanding for data initiatives. The framework has been developed using a Practitioner Design Science Research approach (Nagle et al. 2017) over the past 4 years (see Appendix 1, Table 5 for summary), which in terms of Gregor and Hevner's (2013) contribution framework is categorised as developing a new solution for a known problem. The problem was further explored in a survey of 51 organisations globally on the maturity of their data capability¹. Currently in its fourth iteration, the framework has been evaluated with: (i) 96 data practitioners from various organisational types, (ii) a case-study of a technology platform provider over 12 months, (iii) feedback from 6 workshops, and (iv) a survey of 12 practitioners (sampled from the 96) that have utilised the framework multiple times. While shown to have a significant and positive impact on the development of shared understanding for data initiatives, it has also generated significant contributions to practice and to the IS knowledge base. From a practical perspective it has been used in data projects that have generated an estimated value of €40 million. The practical value of the framework itself is evident in the fact that it has become embedded in the data practices of organisations that have taken part in the evaluations for tasks such as: developing data strategies and data project plans, conducting data audits and root cause analyses for data problems. From an IS domain perspective, the study itself is an exemplar of Practitioner DSR that has developed a rigorously evaluated knowledge artefact in the field. The data from the evaluations have also provided insights into the barriers of creating a shared understanding for data initiatives and potential solutions to these barriers.

2 The Data Value Map Design

The effectiveness of frameworks such as Kaplan and Norton's Balance Scorecard (1995), Strategy Maps (2004), and Osterwalder's Business Model Canvas (2010) highlight the power of visual tools in facilitating communication, collaboration and allocation of resources. While the visual aspect is just one dimension of these frameworks it is deemed essential to the success of developing a shared understanding (Roam 2009, Roam 2011) and thus is seen as a core facet in the design of the Data Value Map. Moreover,

¹ Survey consisted of 16 multi-part questions that extensively explored the data capabilities of the 51 responding organisations, of which 55% were headquartered in North America, another 22% in Asia/Australia/Pacific, 14% in Europe, and 6% in Africa, with the remainder headquartered in South America and the Middle East.

the underlying objective of introducing the Data Value Map is akin to that of introducing “a new discursive template that will make it possible for organizational members to notice new things, make fresh distinctions see new connections and have novel experiences” (Tsoukas and Chia 2002 , p579).

The following section describes the most recent design of the Data Value Map (version 4) and is split into two parts (i) the design of components of the framework, and (ii) the design of its intended use.

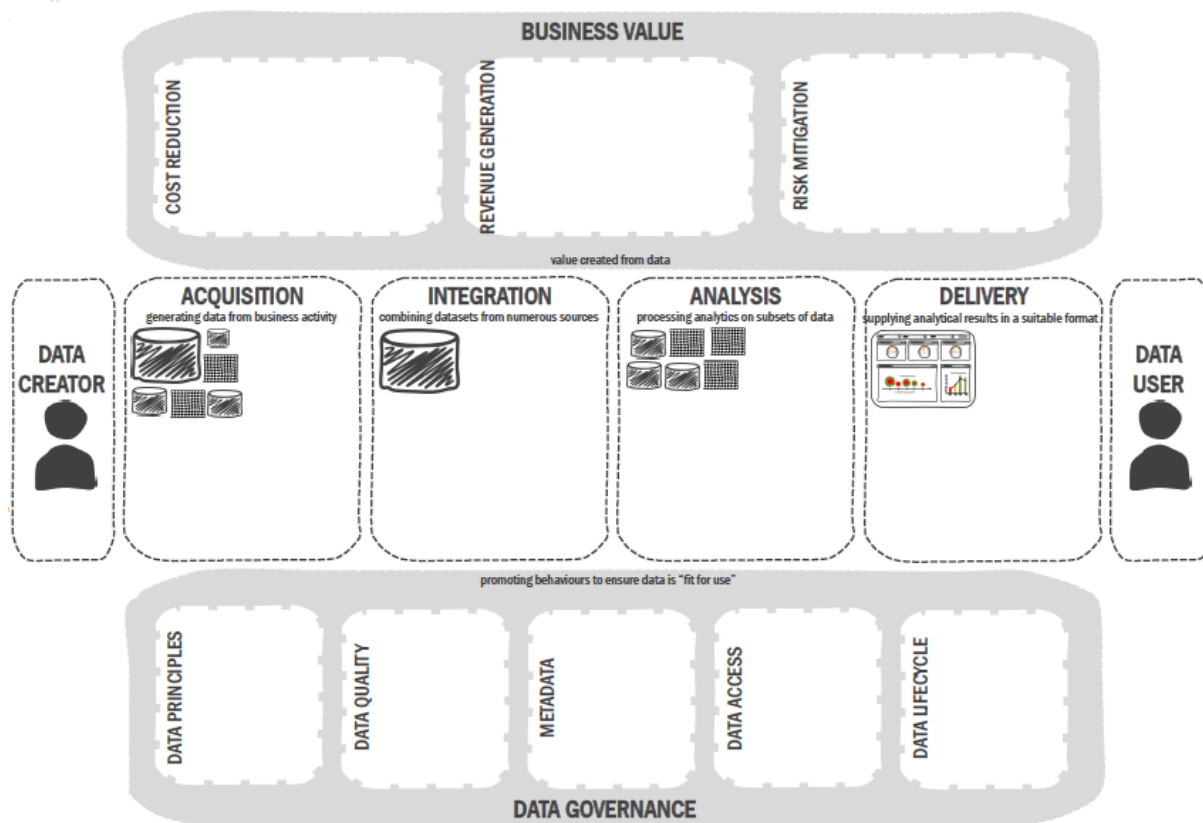


Figure 1. The Data Value Map (Version 4)

2.1 Data Value Map Components Design

The design of the components draws on: (i) a range of literature, and (ii) the survey completed during the problem exploration phase that highlighted a range of data issues being experienced by organisations. For each component a brief description is given along with the shared understanding aim of its design in overcoming relevant data problems.

Business Value: The business value component outlines a focus on the value created from data initiatives. While a focus on value is always assumed, it is not always applied. For example, 83% of the organisations in the survey infrequently if ever calculate the cost of bad data. This is quite a big oversight when you take into account: (i) the estimated \$3.1 trillion lost to bad data in the US per year (IBM 2016, Redman 2016), and (ii) Redman’s (2008) rule of thumb which notes, to do a task with bad data will cost you 10 times more than to do the same task with good data. Leveraging studies that have focused on measuring and communicating the value of IT (Mitra et al. 2011, Ward et al. 2008), the DVM aims to continually emphasise a focus on value to facilitate a shared understanding of how data is an organisational asset and improving the organisation through the benefits of cost reduction, revenue generation or risk mitigation.

Acquisition: The acquisition phase of the DVM details the gathering of data on business activities and entities. The rigorous examination of the data sources is especially important as potential data issues

should be identified as early as possible. Many of these issues arise as many organizations do not know what data they have, how critical it is, where the data is stored or the degree of redundancy of that data (Khatri and Brown, 2010). By visualising the acquisition component of the DVM and documenting all relevant data sources, the aim is to achieve a rigorous examination of why the data needs to be acquired and as a result, more of an understanding on the value the data source will bring.

Integration: The next component of the DVM is integration and describes the combining of data from the data sources acquired. This is indeed an important aspect in the process and was noted by 45% of companies in our survey as being their biggest pressure in driving analytics investments, due to their data being stored in silos. By allowing the visualisation of the integration of an organisations data the aim is to facilitate a realisation/understanding of how integrated their data actually is, and indeed how close they are to achieving a single version of the truth (SVOTT) (Dyché and Levy 2011), which from our survey only 20% of organisations have.

Analysis: The data analysis component describes the implementation of analytics on subsets of data. It has been shown that through the development of an analytics capability and putting the capability to work in the right way (the subprime financial crisis is an example of where analytics were used mindlessly), organizations have been able to gain real benefits such as: better strategic decisions, improved asset management, and better risk mitigation (Davenport and Harris 2007, Davenport et al. 2010). By exploring the types of analytics required to generate real business value, the aim is to achieve a more grounded understanding of the role of analytics and reduce the risk of mindless behaviour (Swanson and Ramiller 2004).

Delivery: The delivery component describes how the analytical results are delivered in a suitable form to its users. Delivery determines the way a data user will receive their business data to answer the business questions they have posed. For example, a data user may want to know the top performing product in terms of sales revenue. Therefore, the most important thing to the data user is the delivery of high-quality data in a timely manner. It is also important that this data is presented with a certain amount of visual impact so that the story being told by the data is easily interpreted (Few 2006). The objective of the delivery component is gaining an understanding of the needs of the data users and how best they would like the data to be delivered.

Governance: Underpinning the four components (acquisition, integration, analysis, and delivery) of the Data Value Map is data governance. In our framework, governance is defined as the promotion of behaviors for good data practice. While being a very important aspect of the DVM our research has shown that data governance is a problem area for the majority of organizations. From our survey there is recognition that the implementation of a data governance policy does not take that long with 53% of respondents indicating that a data governance policy can be implemented in less than 3 months; however, only 10% actually have a policy in place. The types of such behaviors can be categorized under the following headings: (i) data principles – clarifying the role of data as an asset, (ii) data quality – establishing the requirements of intended data use, (iii) metadata – establishing the semantics or ‘content’ of data so it is interpretable by users, (iv) data access – specifying access requirements of data, and (v) data lifecycle – determining the definition, production, retention and retirement of data (Khatri and Brown 2010). The design of the governance component aimed to build an understanding around what type of data governance organisations have in place, what their maturity level is, and ensure it becomes an integral part of data initiatives.

2.2 Data Value Map Usage Design

As part of the artefact a guide on how to use the DVM was also developed. This involved a set of questions to be answered for each component. Table 1 outlines the questions for the four central components of acquisition, integration, analysis and delivery (see Table 1). The aim is to ensure that data is given the primary focus in developing a shared understanding for data initiatives. Following the IS characteristics of people, process and technology (Keen 1981, Keen 1993) these questions can be applied to

each: data source acquired, integration point, analysed data set, and delivered data set. In addition, both the business value and governance components have three questions for their respective benefits/behaviours. These questions include: (i) what is the benefit/behaviour? (ii) who is the owner? (iii) what is the measure? Coming from Ward *et. al* (2008) these again provide a structure from which a shared understanding can be reached.

Data	Why is the data acquired/integrated/analysed/delivered? This ensures the underlying objectives and motivations for doing the data task are clearly detailed.
	What data is acquired/integrated/analysed/delivered? This ensures the actual data involved in the operation is defined.
	When is the data acquired/integrated/analysed/delivered? This ensures the temporal aspect of data is not overlooked. Very important in keeping the quality of data high in terms of timeliness.
People	Who acquires/integrates/analyses/delivers the data? This ensures all stakeholders are identified for all data tasks outlined. If possible these stakeholders should be included in discussions.
Technology	Where is data acquired/integrated/analysed/delivered? Details the data initiative technologies that are needed for each of the data tasks.
Process	How is the data acquired/integrated/analysed/delivered? Outlines the actual processes needed to move the data from one phase to the next.

Table 1: *Questions underlying the application of the Data Value Map*

However, there are varying levels of shared understanding and various different aspects of data initiative to build it around. In some cases, a simple vision alone could fulfil the shared understanding requirement. For others, a detailed map of a current data initiative could be needed to create a common ground among a range of stakeholders. To aid users get the most benefit from the framework and resulting shared understanding, the visual thinking technique SQVID (Roam 2009) should be employed in preparation of their mapping. In essence, SQVID outlines five bi-modal characteristics that enables the alignment of the data initiative with the shared understanding need. These characteristics include: (i) simple v elaborate, (ii) quality v quantity, (iii) vision v execution, (iv) individual v comparison, (v) or change v as-is. The aim of doing this technique before you start mapping is to create a map that you think will provide the most effective platform to create a shared understanding.

3 Evaluation

Summarised in Table 2 are the evaluations that took place during the iterative development of the Data Value Map artefact. All of the evaluations have played an important part in the evolution of the artefact, but for the purposes of this paper evaluation 1 and 2 are briefly described with most of the emphasis placed on the most recent evaluation, which rigorously evaluated the effectiveness and usability of the artefact.

3.1 Version 1 and 2

The first evaluation tested the validity of the concept with 36 data practitioners. The practitioners were given the DVM to map out a data process, highlight a pain point and suggest a solution. The resulting demonstrations of the DVM were analysed by the authors. From the results it was apparent that data was not the key focus of the utilisation as technology was often the most visible aspect on the DVM. In addition, it was evident that the artefact lacked a value component. This made it difficult to ascertain the impact or importance of the pain-points and/or proposed solutions. As a result, this restricted the amount of shared understanding that could be built.

Design and Build	Date: Jan 2013 - Apr 2013	Date: Jan 2015 - Feb 2015	Date: Mar 2016 - April 2016	Date: Nov 2016 - Dec 2016
	Version 1: Basic 5 components. See Figure 3 (Appendix 1).	Version 2: Six components, including business value. See Figure 4 (Appendix 1). Minimal formal guidance on usage.	Version 3: No visual change on version 2 but included questions for each component for improved guidance (eg see Table 1).	Version 4: New visual (business value change) See Figure 1.
Evaluation	Date: Apr 2013 - Jan 2015	Date: Feb 2015 - Mar 2016	Date: April 2016 – Nov 2016	
	Data sources: (i) 36 documented utilisations.	Data sources: (i) 31 documented utilisations , (ii) 1 in depth examination of use over 6 months in a technology platform provider.	Data sources: (i) 29 documented utilisations, (ii) feedback from 6 workshops, (iii) survey on 12 practitioners effectiveness of tool in developing a shared understanding, (iv) 6 month extended examination of the previous case.	
	Analysis: Some fundamental flaws with design. Most pressing was the lack of a value component. Also lack of concise focus on data was evident.	Analysis: In depth examination highlighted very strong evidence of the impact and value of the framework. However, significant output inconsistency and confusion about how to best use the framework was recorded. Focus on technology still evident.	Analysis: Compelling evidence to show strong utility and effectiveness of the DVM in creating a shared understanding. Improvement in quality of DVM’s created but questions were found to be restrictive in some cases. Also need to make business value more central was highlighted.	

Table 2: Summary of artefact evaluations.

The evaluation of version two initially mirrored the first by asking a further set of 31 practitioners (none of which had taken part in the previous evaluation) to use the DVM to map out a data process, highlight a pain point and suggest a solution. The results were encouraging as value became more apparent but there was still a lot of internal inconsistency and lack of clarity in the problem they were trying to describe. Again, this highlighted a need to support consistency in the use of the DVM to improve the chances of creating a stronger shared understanding. More importantly, the in-depth case examination over the course of six months demonstrated the communicative potential of the DVM. The case study analysed the use of the DVM by a key data stakeholder trying to develop a shared understanding around the data maturity of his organisation and need for particular data initiatives. The examination was documented through several interviews with the key data stakeholder as well as documented uses of the DVM over the course of the six months. In effect, after being unsuccessful for two years in trying to shift the organisational mind-set from that of “data being a by-product with no importance”, the key data stakeholder used the DVM to outline the value of data. With some surprise the stakeholder found that “they (top management team) actually got it”. The key data stakeholder was surprised as he basically repeated the same message in the past but this time “with some lines and boxes” (the DVM). In essence, this demonstrates the clear impact of creating a shared understanding using the DVM. In addition, over the course of six months the use of the DVM directly led to the realisation that a data strategy was needed to ensure future success, which was later developed with 6 DVM’s, each one a milestone to making data an organisational asset in the case organisation. Ultimately the DVM was adopted as the defacto communication platform and foundation for shared understanding around the organisation’s data initiatives.

3.2 Version 3

The evaluation of version three has been the most comprehensive and rigorous to-date focusing on the effectiveness and usability of the DVM. As with the previous two evaluations 29 practitioners were given the relevant version of the artefact along with the questions in Table 1 as a guide in mapping out a data process, highlighting a pain point and suggesting a solution. The resulting demonstrations of the DVM were analysed by the authors along with requested comments from the practitioners (see Table 3 and 4). The in-depth case examination was also extended from the previous evaluation for another six months and tracked the use of the DVM as a tool for guiding the operationalisation of the data strategy into actual data projects. In addition, the evaluation also incorporated feedback from 6 DVM workshops facilitated by the authors and a survey that examined the use and effectiveness of the DVM in developing a shared understanding. The workshops lasted between 2 hrs and 8 hrs and were focused on guiding the use of the DVM, which in total had over 60 participants. During the course of the workshops, comments would often be made to the usability and intuitiveness of the DVM artefact, which complemented the authors observations and insights gained from seeing the tool in use. Regarding the survey, 12 practitioners were asked a set of 5 questions, which focused on effectiveness of the DVM as a tool for building a shared understanding. The 12 users were taken from a group of previous evaluators that had since continued to use the DVM in differing scenarios. The results from this set of evaluations are described under the headings of effectiveness and usability.

3.2.1 Effectiveness

Taken from direct quotes from users of the DVM, Table 3 strongly indicates the artefacts overall effectiveness in creating a shared understanding by (i) facilitating data conversations, (ii) aligning different stakeholders, (iii) providing a clear language platform, and (iv) providing a shared vision platform. In addition, the quotes highlight the effectiveness of the individual components of the DVM and how they have individually performed in achieving their respective goals in developing a shared understanding (see Table 4).

Clear language	Its makes it very easy to engage with other departments in the company as the language is direct, clean and focused.
Data discussion support	Triggers discussion on potential for integration of other data around customer's interaction with us, e.g. non-digital channels.
Linking different stakeholders	This tool and the approach facilitated a better conversation between the business and the technical areas.
Shared vision	We used the DVM to go from a discussion of "this is how we generally do things..." to one of how can we create a "single common view".

Table 3: Overall effectiveness of the DVM in creating a shared understanding

The survey further supports the effectiveness of the DVM as a tool for developing a shared understanding. From a list of 8 possible objectives, developing a shared understanding was listed as a key objective by 11 of the 12 respondents. In addition, the shared understanding objective had the most number 1 rankings (in importance) of all the objectives. From an effectiveness perspective, 9 out of the 11 scored it at point 6 or 7 on a 7-point scale with 7 being highly effective. Again this backs up the observations from other evaluation data. The survey also pointed to an even distribution of usage across 4 different modes (i) one-to-one conversations, (ii) meetings, (iii) presentations, and (iv) workshops. In a similar fashion, it highlighted an even distribution of medium-to-high engagements across differing stakeholders, namely: senior executives, middle management, frontline staff, business stakeholders, technology stakeholders and customers. This is very encouraging and shows its potential as a shared understanding bridge between many different groupings.

Shared Understanding Objective	Shared Understanding Effectiveness
Acquisition - value of data sources	Great tool to bring clarity to where data resides in an organisation, its purpose, its owner, value and its governance.
Integration - value of integration	Found the model very useful in explaining the flow of data/information, criticality of integration and how significant value is attained at end stage of the process.
Analysis - mindful analytics	Highlights the value of data specialists in integration & analysis phases– e.g. data scientists and data innovation around the ‘staging layer’ and real-time analytics.
Delivery - needs of data users	An embedded concept within the team and is used from project initiation to business signoff. It is also a useful tool for discussing ideas and examining existing processes where the visual and dynamic tool can allow you to play and discuss various options and changes and then test in a lo-fi way before attempting to implement.
Governance (need for governance)	Highlights basic data governance regime required – e.g. taking ownership of data, ensuring adherence to regulation, tracking currency of data.
Business Value	Illustrates that integrating a variety of reliable data sources together with analytics can generate significant business value.

Table 4: Examples of the effectiveness of the DVM components in creating a shared understanding

From the extended case examination, the DVM was used to translate high-level maps into actionable projects. The key data stakeholder said that after the strategy was developed the organisational sentiment was summed up in the statement “ok, so what do we do now”. In response, the key stakeholder took the first of the six strategy milestones and proceeded to take a thin slice through the mid-section of the DVM. This was then further expanded in its own map and then converted into a DVM populated with user stories. The project delivered over 3 agile sprints generated financial gains well in excess of €1 million per annum. This again demonstrated the potential of the DVM across strategic and operational levels. Moreover, the €1 million plus financial gain is not unique in projects that have directly applied the Data Value Map. Over the past 18 months the DVM has been utilised in projects (from the evaluators) that have created an estimated €40 million in value for their organisations. While it must be noted that each project had varying levels of utilisation it still indicates the use of the artefact in high value data initiatives.

3.2.2 Usability

Across the evaluation set a number of key trends were observed, which aligned with the shared understanding maturity (see Figure 2 for summary). Initially the DVM tends to be used individually as users get familiar with the tool itself and build their own mental model of how data is used within their organisation. As their confidence increases so does their ability to start engaging with other stakeholders to build a more mature shared understanding. Firstly, this may be on a one-to-one basis that is later repeated with other stakeholders. In addition, as maturity increased, the DVM was more likely to be used to primarily communicate to a larger audience and potentially get some feedback. Finally, users facilitated workshops that focused on the DVM to build a strong shared understanding around data initiatives. These initiatives ranged from undertaking a root-cause analysis, to exploring a data innovation or planning a data project.

In conjunction with the increased level of engagement, a deeper level of examination/exploration was also observed as familiarity of the DVM increased. In the extended case examination, this deeper level of examination occurred when the DVM was split into a number of additional layers that focused on the people, technology and process components relative to the data initiative. These layers are predominantly associated with the acquisition, integration, analysis and delivery aspects of the DVM artefact (see Figure 4, Appendix 1) and the questions in Table 1. It was found that splitting the DVM

into different levels, project discussions became easier and more focused. However, for the 29 practitioners that used the DVM for the first time with the questions, a number of them found it difficult to complete and few exploited the rigour they achieved. This would indicate that applying the questions too early can have a counterproductive impact on the perceived usefulness of the DVM as the focus is transferred to the questions rather than a shared understanding of the overall data initiative. As a result, this led to the introduction of the SQUID technique. Finally, the observations from the workshops highlighted a fundamental difference in creating a DVM and consuming a DVM. When consuming a DVM the value component looks intuitively correct, however, when creating a DVM the fact that value is at the end it becomes counter-intuitive to think of value first. As a result, value was placed across the top, which was a repeated suggestion from the workshops (see Figure 1).

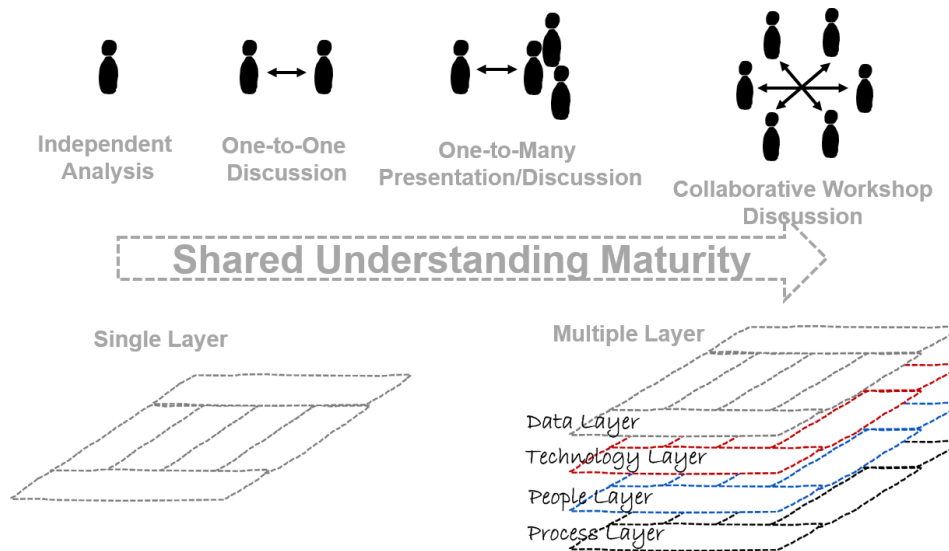


Figure 2: Usage patterns of the Data Value Map

4 Overcoming Barriers to Shared Understanding

From analysing the results across all the evaluations a number of barriers to developing a shared understanding on data initiatives were highlighted. These barriers include: (i) the lack of a mental model, (ii) the lack of a shared language, and (iii) an over emphasis on technology. As well as outlining the barriers, methods in counteracting them using the DVM are detailed.

4.1 Lack of an Organisational Mental Model

The lack of an organisational mental model or visual map of data creates a significant barrier in developing a shared understanding that was evident during the development of the DVM. As a recent evaluator mentioned “it has highlighted different mind-sets and attitudes within the team to trying new approaches and looking at things in different ways”, which made it difficult for users to engage and align on data initiatives. By providing a mental model for data initiatives the DVM enables organisations better understand the many facets of data and how data can be used effectively. Similar to how Osterwalder et al. (2010) enabled the development of a shared understanding for business models. In addition, having an organizational mental model provides a consistent sense-making template (cf. Kurtz and Snowden 2003) that will allow them make sense of potential opportunities or threats (e.g. big data, or IoT). As one of evaluators stated, the Data Value Map is a “valuable tool to align stakeholders and encourage users to think of the big picture”.

4.2 Lack of a Shared Language

The lack of a shared or common language is also a key barrier to developing a shared understanding on data initiatives and alignment in general (Preston and Karahanna 2009). Throughout the development of the DVM the lack of a consistent language was clearly evident from which a number of notable findings were documented. Firstly, it was found that analytics is the most associated word with data. So much so the two are almost viewed as synonyms: when people think of data they automatically think of analytics. Whether the reason for this is the strong promotion and hype around analytics projects was not explored, but the automatic classification of data projects as analytical projects is not helpful. In a similar vein, semantically parallel words as simple as information and data, or figures and numbers mean very different things to different people. Without even broaching more complex terms like master data management or data warehousing the lack of agreement on terms like data and information highlights the lack of a shared language on data. Another finding highlighted that governance, integration and value are the least associated terms with data. While being one of the most important aspects in data, governance is rarely ever mentioned when the topic of data is first explored using the DVM. This highlights gaps in their language, ultimately impacting on their ability to create a more rounded shared understanding. However, having identified gaps in language or understanding, more focus can be put on those areas and an effort can be made to develop a consistent terminology that can be applied across an organisation or used to create an island of shared understanding within an organisation.

4.3 Over-emphasis on Technology

In line with view that the biggest mistakes organisations make with data is to treat it as a technology asset (Fisher 2009), the final barrier to developing a shared understanding is the over-emphasis on technology in data initiatives. In early uses of the DVM this over-emphasis was clearly evident as many completed versions were largely populated with logos of technology vendors. For instance, in the acquisition stage you would have the likes of SAP and Salesforce, with very little mention of the actual data being acquired (e.g. employee or customer). This focus on technology did very little to create an understanding of why the data was actually acquired in the first place and how it added value to the organisation. It also makes it difficult to highlight data issues if the conversation is always at the level of the technology. In a number of cases the modus operandi in solving data issues was to implement technology solutions with very little examination of the data priorities. In these cases, there was an expectation that the technology would not fully solve the problem, for which an additional 6-12 month post implementation timeframe would be needed. In two cases, even before any diagnosis of the actual data problem or use of the DVM, one person was adamant that Hadoop was going to be the solution while the other was sure that Microsoft Dynamics was the only answer. These behaviours highlight mindless technology centric mentalities (Weick et al. 1999) and how disruptive they can be to the development of a shared understanding of data. However, the issue is not that the technology discussion takes place, it's that it becomes the key focus of the data initiative. As a result, the DVM positions the technology discussion within the context of the data initiative. This facilitates more balanced conversations that do not lose sight of the data focus.

5 Contributions

Overall, this study has made significant contributions to the IS body of knowledge and IS practice domain. The foremost contribution is the Data Value Map artefact itself. From an academic perspective it can be seen as: (i) a new 'discursive template' that enables the alignment of different mind-sets and facilitates novel approaches and perspectives, or (ii) a new type of visual strategy map for data initiatives. From a practical viewpoint it is seen as an effective tool to aid the implementation of successful data initiatives, as evidenced from its adoption in high value projects - estimated in excess of €40 million. Moreover, the practical value of the Data Value Map is evident in the fact that it has become embedded in the data practices of organisations for tasks such as: developing data strategies and data project plans, conducting data audits and root cause analyses for data problems. Another contribution is

the study itself, as an exemplar of Practitioner Design Science Research that fully embraces: (i) solving an important problem, (ii) conducting rigorous evaluations, and (iii) delivering business and knowledge impacts. In particular, the multi-method evaluation ensures the highly relevant results are backed up with sufficient rigor. In addition, the format of this paper and how it communicates each aspect of the study could be seen as a guide for future DSR projects, where the effectiveness and usability of the artefact is of utmost importance. Finally, reflecting on the results of the evaluations have also provided insights into the barriers of creating a shared understanding for data initiatives and potential solutions to these barriers. In a sense, the study creates new knowledge around the ingredients of shared understanding, namely: (i) shared language, (ii) shared mental model, and (iii) engagement from different mind-sets.

Appendix 1

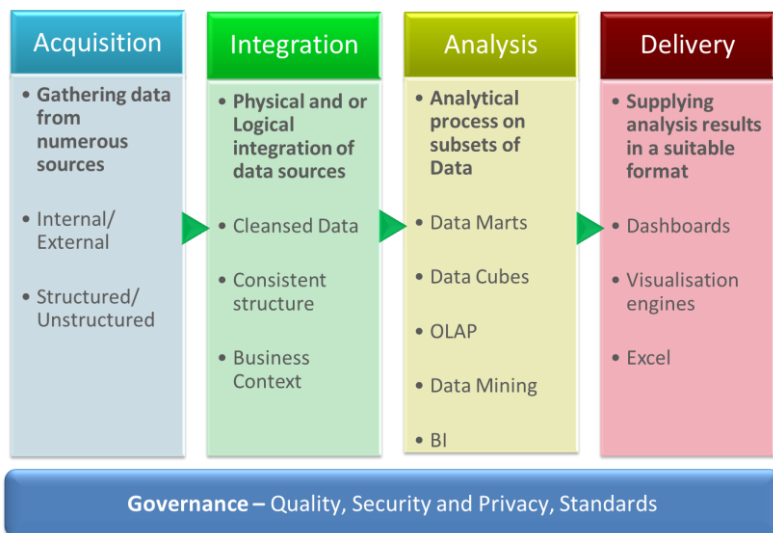


Figure 3: Version 1 of the Data Value Map

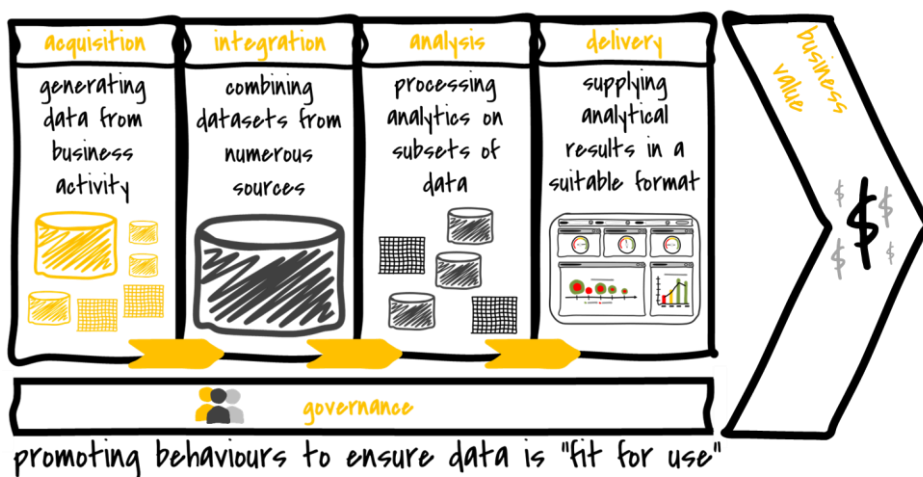


Figure 4: Version 2 of the Data Value Map

PRACTITIONER (relevance)		iteration			RESEARCHER (rigour)	
artefact:		no.	start date	end date	study title:	
Data Value Map		1	Jan '13	Jan '15	A Framework for Developing Shared Understanding on Data Initiatives	
		2	Jan '15	Mar '16		
		3	Mar '16	Nov '16		
		4	Nov '16	Ongoing		
BUSINESS IMPACT so what? Immediate impact for users when communicating the value of data initiatives. Used as a platform for shared understanding in projects with estimated value of €40 million	worth solving? Evidence of significant organisational impacts due to a lack of shared understanding around data initiatives.	PROBLEM DEFINITION problem statement Lack of shared understanding around the value of data initiatives.	worth researching? New solution for a known problem (Gregor and Hevner, 2013).	RESEARCH IMPACT so what? New discursive template.		
	well organised? Built for practitioners with practitioners and evaluated in the field.	DESIGN & BUILD artefact description Platform for building a shared understanding on data initiatives.	well documented? Articles supporting artefact design, see Section 2.1. Documentation of each use of the artefact.	New visual map for data initiatives. Example of Practitioner Design Science Research		
	what results? Artefact has demonstrated validity, usability and efficacy in solving the problem.	EVALUATION artefact demonstration 96 practitioners in the field (Validity, Usability). Survey and case study (Efficacy).	what findings? Key insights into the barriers to developing a shared understanding.	New insights into the development of shared understanding		

Figure 5: Practitioner Design Science Research Approach (adapted from Nagle et al., 2017)

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