Deliver Value in the Data Economy

Jarkko Moilanen
Toni Luhti
Jussi Niilahti

29th Sep 2022

Publisher: MindMote Oy, Kangasala, Finland

ISBN 978-952-94-6305-3 (hardcover)
ISBN 978-952-94-6306-0 (PDF)
ISBN 978-952-94-6307-7 (EPUB)
ISBN 978-952-94-6308-4 (MOBI)

Contents

Preface

Based on data product-related discussions with 200+ companies, we have seen that the gap in knowledge is not in technology or adopting technology to monetize data assets. A lot of tools, platforms, and technical solutions exist and we have skilled people on the job. But the problem is that they do not know what to do or why. The business layer in companies is lagging behind and has difficulties understanding and applying data economy in their business. We want to change that!

Deliver Value in the Data Economy book is written for business developers, CEOs, CIOs, CDOs, and all developing data-driven businesses. If you happen to be in a position in which innovating new business or leading digitalization is your thing, this book is for you!

The book was written by three experienced Platform, API and

Data Economy professionals because such a book is needed by many. Our backgrounds are introduced in the Meet the Authors chapter. We've done a lot of consulting and the same concepts, questions, concerns, etc. are repeatedly coming up. We thought that it might be handy to put all the repeating things in a book and share that.

The book offers insights based on our experiences in practical cases as well as results from academic research we conducted as well. Two of us have doctoral degrees from ecosystem driven platform business. We will leave the technical aspects in the outer rings since those aspects are already covered in various blogs and podcasts. The focus is on the business side of data commodities, known usually as data products and data as a service (DaaS).

We wrote a blog series called *100 Days of Data Economy*[1] before authoring this book. We used that series as an exercise to clarify our thoughts before putting it all in a package. Enjoy reading the book and feel free to connect with us!

[1] https://www.dataproductbusiness.com/100days

Chapter 1

Introduction

Data could unlock your future success

Data is the most valuable asset in growth-oriented companies. Data is like any other commodity and requires refining to gain more value in the eyes and processes of customers. The Data Economy is on the rise. A conservative estimate of the market size for data in the global hospitality industry alone was US $43.2 Billion in 2018, and it has been doubling in size every three years. According to DataLandscape in the EU the estimated size of the Data Market was 60 Billion euros in 2016.

Data-driven digitalization is proven to be profitable since ac-

cording to a survey conducted by McKinsey Global Institute 2013 data-driven organizations are over 20 times more likely to acquire customers, half a dozen times as likely to retain their customers, and 19 times as likely to be profitable[8].

The importance of data has increased lately as technology has enabled us to collect more and more data about events and objects in our daily life. Big data has been in the front-line discussions for some years. According to Cavanillas et al. data has become a new factor of production, in the same way as hard assets and human capital[15]. It has been estimated that big data can increase productivity and efficiency resulting in up to 60 % increase in retailers' operating margins[41]. OECD has estimated that efficient use of big data could reduce the costs of administrative activities by 15–20 % in the public sector in Europe[48].

Digital transformation leads to major changes in established value creation structures and traditional business models of companies [75, 71]. Data are increasingly used beyond the improvement of internal processes by serving as a strategic resource for the development of data-driven innovations and business models [76, 79]. This data-driven innovation and creation of economic value is less and less created by a single organization or in traditional value chains but instead takes place in cross-industry, socio-technical networks – so-called data ecosystems [35, 49, 75].

Data is no longer a side show

At the same time as this data governance renaissance, data is increasingly becoming an article of trade or commerce - in short, a product [26] or as we know in services world, a service. The era of data economy is about the process of refining data or commoditization. Data is becoming an independently valuable asset that is freely available and interchangeable on the market[31, 74, 43].

A "commodity" is defined as something useful that can be turned to commercial or other advantage. Some well known examples of traditional commodities are grains, gold, beef, oil and natural gas. In brief, a commodity is a basic good used in commerce that is interchangeable with other commodities of the same type and are often used as inputs in the production of other goods or services.

Open data is the strong manifestation of this new era. The government mandates and open data policies from multiple countries and public entities continue to contribute to the process of data commoditization. Openness has the benefit of increasing the size of the market. The greater the size of the market and the demand for a resource, the greater the competitive pressure on price and, hence, the increase in commoditization of the resource.

Yet the data economy as business is still a relatively new

thing and we are still taking baby steps at the global level. Keep in mind that the success story of APIs took about a decade or even longer depending of your point of view.

Platforms and APIs

The emerging API Economy has become a concrete opportunity to go beyond the traditional development of vertical ICT solutions [9]. Building on open APIs and service oriented computing [65], the API economy creates new business value by enabling innovative collaboration between stakeholders. Such stakeholders include companies, public authorities and research institutes, seeking for the numerous advantages – for instance, according to Benzell et al, API adoption increases firms' market value by 10.3% [7].

From the technical perspective, APIs are used to provide abstracted access to massive data and services to external developers through Open APIs [78]. These Open APIs[1] can be free for anyone to consume, or associated with a monetary plan or other provisioning mechanisms. Hence, they are at the core of novel business activities that have emerged with the increasing use of the Web as an application platform, at least potentially.

New paradigms, such as serverless computing [42] and web mashups [32], are inspiring designs that are fundamentally

[1] Open API is classification which contains Public APIs and Partner APIs.

API centered. Hence, the APIs become a key part of virtually all application development. The API Economy, where numerous APIs for various purposes are provided by ecosystem participants [65], has already changed the application development by offering Open APIs and even integrated open source implementations.

The number of available APIs has been growing steadily in recent years. For example, just in the world's biggest API catalogue Programmable Web, the amount of available APIs is over 24 000[2]. The repositories of APIs list only the Open Data Interfaces and Public APIs, which represent only a fraction of APIs – there are partner and private APIs, which are not listed in the catalogues.

The Data Economy will not become big over one or two nights. The evolution of the data economy might follow the path laid out by the API Economy described above. The big question is what is stopping us from making the data economy big just now? It's easy to say what is not the problem first and then tackle the more difficult issues.

But why will you probably fail?

The above clearly indicates rational reasons to take economic advantage from data in one form or another. Still too few

[2]https://www.programmableweb.com/ read Jan. 27, 2022

companies succeed in entering the data economy. Why is that?

Amount of data is not the problem

Having data seems not to be the problem since before 2010 it was estimated that we humans generate twice as much data in two days as we did from the dawn of man through 2003. In addition to that, IoT driven machine generated data is increasing all the time. According to IBM, 90 percent of the data in the world today was created during the last two years alone[37]. The data growth is most likely not decreasing as new devices, sensors and technologies emerge.

Accessing the data is not the problem either

The biggest problem is not in accessing the data either. The emerging API Economy has become a concrete opportunity to go beyond the traditional development of vertical ICT solutions [9]. Building on open APIs and service oriented computing [65], the API economy creates new business value by enabling innovative collaboration between stakeholders.

From the technical perspective, APIs are used to provide abstracted access to massive data and services to external developers through Open APIs [78]. Despite of the technical opportunities APIs are not too often treated as products but as integration solutions. This results in raised risks and low quality developer experience on the API consumer side. The

result is that data is available but the mechanism to access it is not trusted or is difficult to use.

In brief, we can sum up that data is gathered more and more easily and automatically, we have efficient data management solutions and technical solutions to enable access to data. For the data economy to emerge, it has to be monetized and commercialized.

The problem is in creating business around the data

Just like with APIs, the data economy has started from the activities of technical people paired with a bunch of data modelling ontology professionals. The business people have not been involved. One of the reasons is that the first way to take advantage of the data has been to improve the efficiency of processes. These exercises have been very technical in nature. The more wider advantage of data requires that business people are involved and take the lead. We should move forward to data monetization and commercialization.

In the academic literature, three terms are used to describe the data economy more profoundly: data commercialization, data monetization and data reuse. According to Thomas and Leiponen, in data commercialization, data itself is monetized as an asset, rather than analyzed, and the resulting insights combined with existing or new products and services[66].

Data monetization has been used as an umbrella term to define all actions which aim to generate revenue with or through data or data-derived products or services. Data reuse discusses the topic from a more technical point of view and focuses on the secondary use of the gathered data.[30]

If the above are the problems, then what should be done? To be able to succeed in the data economy, one must understand the world we live it, the new business logics that apply (for example, the subscription economy). Another fundamental is that data is no longer just data, it has become the center piece of value chains. Data has to be refined and treated like a valuable commodity. Above all, data-driven value creation must be lead by business decision-makers with the appropriate skills, not the technical people.

The solution is to approach data with a product mindset

Given the nature of data ecosystems requiring border crossing activities in value creation, data used in the process must be packaged into products and services for more efficient reuse and sales. Jedd et al state in Harvard Business Review that data should be approached with a product mindset [21]. Note that a product mindset is not the same as considering data only as products, as service dominant logic is taking over the data as well. We are still living in the strong

data product phase, but data as a service is already lurking around the corner. Thus when we say approach data with a product mindset, we see it as more holistic and abstract way to include data-driven services as well.

Data as a Product was one step towards servitized data. Open data started the tsunami of data and after the hype, data monetization and commercialization have raised the often discussed topics also in the academic research [45, 31, 39]. Yet the focus has been mostly on big data and technical aspects of the data. Emerging data economy markets are not fully yet here yet. Instead we are still in the phase of learning to utilize and monetize data - both require data value streams which are expected to follow the service-dominant paradigm more than goods-dominant paradigm.

The solution is a value delivery framework

Single data products and services are a great start and that is how commodity portfolios are developed. However, that is not enough. The products and services are part of your data economy strategy and tightly connected to data literacy skills, organization structure, business intelligence and technical solutions enabling data flows. That ”machine” at best is your value delivery machine and must be managed with a clear model. That is what we offer to you at the end of this book. We call the model ”*Data Value Delivery Frame-*

work".

From Products to Services and Subscription Economy

Data as a Product seems to be a topic from the past and a paradigm change in even larger scope towards service-driven offering has occurred. The data economy landscape has already changed. Data as a Service is the term that dominates the emerging data economy and is likely to be the foundation of the future data value streams. Thus using the term Data as a Product might sound outdated to some. Some of us want to approach the data economy from a service-dominant logic point of view. Why? Take a look at the surrounding development and bigger trends and you'll see transfer from owning (products) to consuming (services) and from one-time purchase to subscription.

People are less interested in owning. Younger generations do not want to buy a house with 30 years of payments, they rather not own cars or cottages. We no longer buy CDs or DVDs either. Instead we subscribe to services which offer us the goods - both physical and digital. We are no longer paying to own - we are paying to get access.

To watch movies and TV shows we are not buying the digital products or physical discs. We subscribe to Netflix or a similar service. That way we get access to hundreds of movies

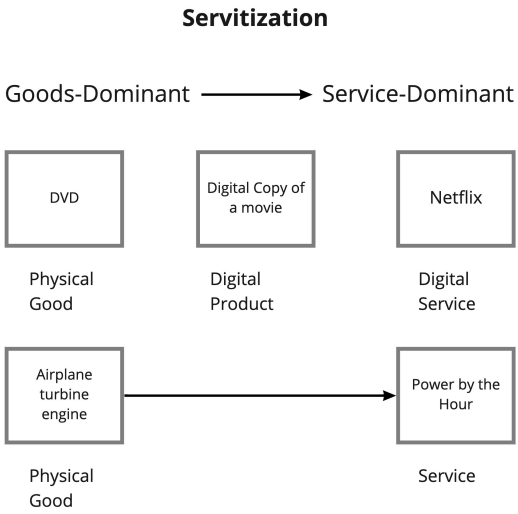

Figure 1.1: Servitization and Service-Dominant Logic transfer are the major trends in the economy.

and TV series. Of course, our favourite shows are part of different streaming services and we need to subscribe to two of them, and in worst case, more and more to multiple services.

The above described service driven logic is not B2C specific. Products get wrapped around with services such as the customer experience and solution levers. Many products regardless of nature, hardware or software, are being offered ”as a service”. The term used to describe the phenomenon is servitization.

The same is the reality in big scale between companies as well. In its simplest terms, servitization refers to industries using their products to sell “outcome as a service” rather than a one-off sale. The phenomenon of servitization is found beneficial not only with streaming media business but also in manufacturing. In servitization, manufacturing businesses offers additional services to supplement their traditional product offering for example with maintenance and keeping a fleet of vehicles on the road as a service. Servitization is usually a subscription model and can be applied to most industries in one way or another. Jet engines are sold as ”Power by the Hour” and the airline does not pay for the engines, but for the time they are flying. This model includes necessary services and, for example, data about the engines. This is a big change compared to the old jet engine landscape.

In the data economy, the example is to provide the updated

situation as a stream of data, just like we stream movies from Netflix. We are not interested to owning the data, we want to consume it to create value for our own purposes. With data instead of owning it, consumers want to have rights to do something with it. Just like with APIs, which you do not buy to own, but to consume.

In the Data as a Service logic, the product might be there, but what is sold and purchased is the service. Furthermore, the data as a product is not always even present since it's just a data stream. Limitations of usage, pricing, name and all that traditional business logic is in the service instead. The change has been noticed and explained also by the academic community. What we are witnessing is the age of service-dominant logic.

In short, we can theoretically separate products and services from each other (and the differences are discussed in details later on), but in practical life and business, it rarely is needed. Thus we can take the initial step in data business development, and for sake of simplicity use the product analogy.

Most companies that produce products hire people for the role of product manager. A crucial part of a product manager's job is to work with marketing, sales, customer service, and engineers to figure out:

- What is this product? What is the business problem it

solves?

- What is the value this product generates?
- Who is the audience or targeted customer group for this product? What are these potential customers' pain points? What are their hopes and dreams?
- What features should this product have so these customers will want to buy it? Equally important, what features shouldn't be part of this product?
- How does the company get the word out about this product? What messaging will convince people to buy it? Which channels should you target?

To succeed in the above, a lot of new kinds of understanding of business environments must be adopted, new kind of business models memorized and new teams formed. The business skills and models needed to lead above are discussed in depth in Chapter 3: Business Data Environment.

But, as your self, what if you used the same approach for at least some of your data? What if you would offer data products for your customers and data ecosystem partners? With the help of the data products they could build better and value-creating solutions for their customers as well as shared customers with you. Eventually, this leads to data product management and productizement which, in turn, requires standards to be effective and automatized.

Standardizing processes and results is part of the solution

In the data schema landscape several initiatives have emerged and aim to standardize business segments under same data schema. For example Open Travel Alliance has published Open Travel Schema which aims to ensure traveler and supplier information flow smoothly throughout travel, tourism and hospitality[3].In geospatial scene Open Geospatial Consortium (OGC) including more than 530 businesses, government agencies, research organizations, and universities has done similar releases[4].

It seems that segments of data are been standardised as de facto standards by various organisations and associations. History will tell us which of them actually succeeded to become de facto standards. Common pattern seems to be to build standards in cooperation with companies building solutions in the selected business segment, which is common in the history of de facto standards. Reuse of existing standards is something to consider instead of reinventing the wheel. Thus one of the crucial standards for data economy will be machine readable data product description which enables for example process automation, interoperability, tools development and easier comparison of prod-

[3]http://opentravelmodel.net/pubs/specifications/Specifications.html
[4]https://www.ogc.org/docs/is

ucts. The emerging Open Data Product Specification [5] and other fundamentally game-changing technical concepts are discussed in more details in Chapter 5.

As it has been stated before, business decision-makers and developers must lead the data monetization process and make sure it is aligned with general business strategy. Learning new skills needed to lead data product and service development is part of the data literacy program which is often kick-started in companies entering the data economy.

Business skills to craft new value-based revenue streams

The above described problems can be solved by productizing the data into data products, which enables interoperability and ability to use data in multiple context and by multiple organisations (and internally by multiple departments).

But what are examples? How to make business around data? The simplest way to monetize company's data is by selling it [68, 66]. Organizations can provide source data, less differentiated data for others to reuse as a data supplier [66]. Sometimes data need to be analyzed, repackaged or anonymized further [68]. Nevertheless, the data is sold, in a rather raw form or more aggregated one. By parsing,

[5] https://opendataproducts.org

cleaning or cataloging data, company can act more as a data manager and increase the value through transformation of data [66].

Another option is to provide data-based insights or analysis [66, 68]. These insights can carry information considering customer insights, such as segments, habits, interests and plans, as well as advertisement targeting and payment analysis[66]. Thus, companies can provide insights and analysis derived from data, without allowing other companies to access the original data.

Third option is to create new value-adding services and platforms to scale the delivery of data or insights [66, 68, 47]. This can be implemented with dashboards or similar interfaces. Examples of such as Google's smart thermostat product Nest and Foursquare Analytics, where users' location data is analyzed and provided for other companies. The following chapters will contain more real world use case descriptions.

Regardless of the monetization strategy, data quality is something that needs to be taken into account. The reason is simple. Obstacles to monetize data has been identified to be accessibility and quality of data[73], data quality [68, 73]. Fisher and Kingma mention that accuracy, timeliness, completeness, consistency and data relevance are the most used variables when data quality is measured [28]. But don't get

lost in the details and go too deep in quality. Aiming for 100% accurate or complete data is hardly ever justified or wise. Your data quality is measured not in percentages but is it good enough to solve business problems.

Centralized models based on integrating datasets to data lakes and data warehouses are challenged with more robust distributed border-crossing and servitized solutions. Thus we will face the same servitization in the data economy, that we have witnessed in the digital entertainment and aviation business. Data servitization combined with subscription economy models is already becoming the de facto approach in data monetization. The related data as a product and data as a service are discussed in more details in Chapter 4 Data Product Development.

The above has given you a rough sketch of the emerging data economy landscape. The above describes the challenging situation in which most of the companies wanting to go to data economy are now. Entering data economy focused path is transformation journey for the company. It takes time, it will change your company structures, it will affect your business strategy and it will change the architectures. Let's have a closer look at what is ahead.

The book contains 6 chapters with use cases

The Introduction might have sounded a bit academic and it's true that significant amount of data economy related literacy has been used. We have distilled in this book information from 300+ articles [6] and the most significant sources have been cited. The authors have strong academic background with doctoral degrees, which explains that foundations are built on top of existing knowledge, not on opinions.

Theories are used to explain the world and basics. After that it's possible to take the wisdom into use. In short, the book is a combination of academic wisdom and practitioner's experience working together. Instead of purely theoretical writing, we wanted to deliver as practical lessons-learned book in order to be valuable for targeted readers. Even though we started with some literature findings, in the following chapters we focus on real world use cases and talk about findings from companies we have met. The rest of this book gives you the foundations to approach data with product and business mindset instead of looking at it from the data management or technical point of view first.

The book consists of 6 more chapters. Let's have a look at what is ahead.

The second chapter, *Strategy*, focuses on understanding how

[6] https://www.dataproductbusiness.com/literature

data strategy should not be an independent or loose part from companies business strategy. Data should be used to enable better decision-making, support new business initiatives and build better competitive advantage in all of your business levels (strategy, business model and processes).

In the third chapter *Business Data Environment* our objective is to make you think about your data. In order to be able to make data products or services, you need to understand what data you have, in where, how these are interconnected, where you spend money and whether your data is qualified.

The fourth chapter, *Data Commodities as value co-creation tools*, provides a foundation to understand how data products and services are forged and designed based on customer needs. The Data Product Developer eXperience (DataDX) is key element in making the offering lovable and easy to use. Iterative, constantly in a cyclic process evolving data product with life-cycle (with various phases) is in the core of this chapter.

The fifth chapter, *Data must flow in the Data Economy*, starts with a discussion of what DataOps, data architecture and data platform are all about. This is followed by an introduction to the standards of the Data Economy and the key principles of data and data products sharing. This chapter is the most technical of the chapters in the book, although the intention is to generalize and avoid cultivating technical

buzzwords.

In the sixth chapter, *All-in-one value delivery framework*, we focus on packaging it all together! The sixth chapter introduces the data value delivery framework. The Data Value Framework is there to help business leaders understand how large and multidimensional data making can be modelled as a whole, what different things need to be considered, what expertise is required to be outsourced, what to do, and most importantly, how it ensures business value.

The last chapter, *Discussion and Data Economy Mandate*, wraps things up. In this chapter you'll find 10 compact guidelines to follow to succeed in the data economy. All of the authors present their concluding thoughts. In the last chapter we encourage you to take the first steps towards success. You are not alone and most certainly not the last to begin your data economy journey.

Now it's time to take the first step and read the rest of the book!