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Initiative in the  
Digital Economy at Exeter

## Financing the Digital Economy:

From financing products  
and purchases to financing  
service and use

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# Executive Summary

The research reported here explores the role of financial services in the Digital Economy and what the future of the sector might look like as we move from financing products and purchase, to financing service and use. We believe that financial service providers have a key role to play in stimulating the move to servitisation and advanced services, as part of their function in financing the Digital Economy.

This working paper reports on the research that has been undertaken so far in understanding the financial servitisation ecosystem that currently exists. We focus on the industry perspective with the aim of being able to provide a gateway between academia and industry. Much of the research analysis and conversations about the impact of advanced services on the financial services sectors appears to be occurring within silos, looking more at form than function. If the financial

servitisation ecosystem is to be realised, it is important that those researching and working in the area do not keep working in silos. Industry and academics must work together in analysis and policy formation and in the co-creation of value.

Our initial research has shown that a complex ecosystem exists with a number of stakeholders, in a network rather than a dyadic chain commonly analysed in supply chains. If we are to understand how to redesign financial services around solutions and outcomes, necessary for advanced services, we must fully understand what we refer to as the financial servitisation ecosystem. We present a proposed research agenda that would allow the move towards the future of financial services: the financial servitisation ecosystem and, therefore, allow the finance sector to thrive in the Digital Economy.



# 1. Introduction

A report by the UK Government Chief Scientific Advisor, *Services Transformed: Growth Opportunities for the UK Service Economy*<sup>1</sup>, sets out the importance of services, and servitisation in the UK noting that almost 80% of GDP within the UK coming from services-based activities<sup>1</sup>. The nature of services is changing with more people seeking to buy the outcomes that conventional products and services enable rather than purchasing the products themselves. 77% of respondents (600 field service management leaders and IT decision makers), to a survey published by ServiceMax from GE Digital<sup>2</sup>, found that Generation Z (individuals born since 1994) will be the last to experience a product-dominated economy. The question arises as to what affect this will have on the financial services sector.

Financial Services is a key sector for the UK economy, contributing £132 billion to the UK economy (6.9% of total economic output), 1.1 million jobs (3.1% of all jobs) and £29 billion in tax<sup>3</sup> in 2018. The research reported here explores the role of financial services in the Digital Economy and what the future of the sector might look like as we move from financing products and purchase, to financing service and use.

More organisations are considering, and deploying, the use of innovative digital technologies to provide advanced services. Instead of ownership,

customers are getting more used to consumption based on pay per use or subscription. Financial Service providers have a key role to play in stimulating the move to advanced services, as part of their function in financing the Digital Economy. Our research has shown that this push towards advanced services requires financial service providers to do two things: 1) decide if they themselves to adopt an advanced services model for their own organisation offerings; and, 2) identify what they must do to support their customers who wish to move to an advanced service model.

We have found that most of the existing advanced servitisation literature focuses on organisations that wish to servitise, mainly in the manufacturing sector. There is an absence of any detailed discussion of how the changing risks, cash flows and operating models that are brought about by advanced services might be financed, and what the implications are for the financial service providers in the wider economy. In this report we focus on the industry perspective with the aim of being able to provide a gateway between academia and industry. Much of the research analysis and conversations about the impact of advanced services on the financial services



sectors appears to be done within either academic or sectoral silos, for example, the technology used by fintech, or the use of fintech to stimulate innovation or competition in banking, of customer behaviour in using banking apps, rather than taking a more holistic or systemic approach, or discussing the purpose or desired outcome of the finance. If an efficient and effective financial servitisation ecosystem is to be realised, it is important that those researching and working in the area do not keep working in silos. Industry and academics must work together in the co-creation of value.

If servitisation is to succeed in the UK, there is a need for further research into the relationship between finance and advanced services. We need to develop a new understanding of the financing of these services, the impact of innovative digital technologies and digitised data and the role of financial services in the Digital Economy. Our initial research has shown that a complex ecosystem exists with a number of stakeholders, in a network rather than a dyadic chain commonly analysed in supply chains. If we are to understand how to redesign financial services around solutions and outcomes, necessary for advanced services, we must fully understand what we refer to as the financial servitisation ecosystem including the different stakeholders, the relationships that exist between them and the different risks that exist.

This working paper reports on the research that has been undertaken so far in understanding the complex ecosystem and presents a proposed research agenda that would allow the move towards the future of financial services: the financial servitisation ecosystem and, therefore, allow the finance sector to thrive in the Digital Economy.

An explanation of advanced services and servitisation is given (section 2) followed by an overview of the financial services sector (section 3). Section 4 gives an overview of the research method that have led to the results that have been gathered so far in section 5. The working paper concludes with a proposed research agenda necessary to develop the financial servitisation ecosystem (section 6).

## 2. Servitisation and Advanced Services

Servitisation is about “creat[ing] additional customer value” and could range from “the addition of services to core product offerings”; it is a “transition from products to services” and “service infusion”<sup>4</sup>. A similar three themed description is offered by Baines et al<sup>5</sup>: “Base” (post sales service); “Intermediate (ongoing maintenance); and “Advanced Services” (“customer support agreements”, ongoing close relationships and “outcome [based] contracts”). These three themes could be considered as levels that form part of a servitisation journey. Full servitisation involves radical changes to the organisation’s business model matching service-based costs with service-based revenues.

In the definition given by Baines et al<sup>5</sup>, advanced services can be seen as the most developed level within the servitisation journey. Instead of focusing on products, advanced services are high-value business models that focus on the delivery of ‘outcomes’. They are not necessarily data driven but are driven by customer desired outcomes. They typically include:

“(i) revenue payments structured around product or service usage and customer outcome; (ii) performance incentives (e.g. penalties for in-use product or service failure); and (iii) long-term contractual agreements between organisations (e.g. spanning five, ten or 15 years) and cost-down commitments<sup>6”7</sup>

Digitally Enhanced Advanced Services (DEAS) make use of innovative digital technologies to deliver Advanced Services and are data-driven. An example of DEAS is Xerox’s Print Management offering<sup>6</sup> within the manufacturing sector, where customers are charged per print (i.e., for the use of the product-service bundle); to do this, Xerox bundles printing-equipment and maintenance-services.

### 3. Financial Services Sector

Financial Services deal with money and risk. The sector includes banks, insurance, investment and real-estate brokers, as well as firms offering accountancy and advice. It is a heavily regulated sector, with a number of different regulatory bodies setting rules in order to protect consumers, investors, institutions and the wider economy and society. Recently, in order to improve competition in the sector, new businesses based on fintech, data, or that are built around the idea of open banking have been encouraged.

Financial institutions fund investment, innovation and growth, and protection, for both business and personal customers through the provision of capital. Intermediation lies at the heart of all financial services: the matching of those who need money with those that can provide

it. This may be through payments services or through loans and investment, from those that can take on risk to those who wish to lower risk<sup>6</sup>. This may be an insurable risk, such as a fire, or the risk that a loan will not be repaid.

In traditional manufacturing business models (i.e., make and sell), an asset is produced by an Original Equipment Manager (OEM) for sale to another business who will operate and use that asset. An asset is a physical resource that is critical to the operation of the business; it may be a piece of equipment, a vehicle or a building. The cost of development, in addition to any other financial costs, will determine the sale price of the asset. The OEM must ensure a profit if they wish to continue operating. To produce and sell the asset, the OEM must have sufficient working capital to survive while the

asset is being manufactured, which is often a substantial period. A bank, or possibly an investor, often provides this financing and the operator's bank finances the asset purchase price. Both the OEM and the operator will need insurance during this process.

This traditional business model is not useful, and must evolve, for servitisation. The move to a servitisation model requires a move from capital expenditure (CapEx) to operating expense (OpEx), which is not possible with existing models. The new emerging culture where leasing is preferred to ownership, is likely to have an effect on business models. The question of what asset is to be financed, and a decision on revenue models must also be addressed with the benefits to the financier made clear. As risks become less certain and to be borne in different parts of the supply chain, insuring those risks becomes difficult as well.

### 4. Method

The research reported here explores the role of financial services in the Digital Economy and what the future of the sector might look like, particularly in light of the push towards advanced services. A prerequisite to this is understanding the current ecosystem and how it needs to adapt to allow for advanced services in the Digital Economy. Therefore, our research question was what would the financial servitisation ecosystem look like? Information to address this research question was gathered through a review of existing literature, a series of virtual roundtables, conversations with industry experts and attendance at industry webinars.

#### The Roundtables

The EPSRC-funded Digitally Enhanced Advanced Services (DEAS) Network Plus aims to bring together a vibrant community with the ambition of positioning the UK as the internationally leading research and practice hub for Digitally Enhanced Advanced Services (DEAS). As part of the work in identifying a





DEAS research agenda for finance, it was important to understand the different stakeholders that exist, and the challenges that each face. This was achieved through a series of virtual roundtables.

A set of six virtual events were held for representatives from industry: three for asset finance and three for insurance. The three insurance sector events were facilitated by the London Market Forums (LMF)<sup>i</sup>, a cross-sector platform for collaboration and engagement between insurance professionals. LMF works closely with personnel from Lloyd's of London, the International Underwriting Association and other bodies throughout the London Insurance Market. It is the only central industry group of its type in the sector, where insurance professionals meet, collaborate, learn, network, and understand some of the key issues affecting the insurance sector today, from industry modernisation to the changing regulatory landscape.

<sup>i</sup> <https://lmforums.com>

The New World Series, co-sponsored by DEAS, comprised three virtual roundtables that were hosted by LMF which was attended by senior insurance industry representatives. The theme of the special series was the changing workplace, the impact of technology, the effect on people, and how this changing environment is affecting decision making and its impact on the UK's digital economy. Each session had between 18 and 30 senior insurance participants and lasted 90 minutes; in total more than 80 individuals attended the three events. The DEAS Network + also hosted three virtual roundtables for representatives in financial services and asset finance. A final roundtable was held to bring together industry and academia allowing researchers from computer science, engineering, and management to listen to, question and discuss with practitioners from industry their experiences in financing, developing and delivering Digitally Enhanced Advanced Services.

## Webinars

Industry webinars that were attended included Virtual InsurTech Forum 2020<sup>i</sup>, Virtual CogX 2020<sup>ii</sup>, Financial Services Club<sup>iii</sup> and those hosted by the Advanced Services Group<sup>iv</sup>.

## Existing work

Overviews of servitisation can be found in Baines and Lightfoot (2013)<sup>6</sup>, Neely et al (2011)<sup>8</sup>, Raddats et al (2019)<sup>4</sup> and the UK report by Government Office for Science (2018)<sup>1</sup>. We have found that most of the existing advanced servitisation literature focuses on organisations that wish to servitise, mainly in the manufacturing sector. There is an absence of any detailed discussion of how the changing risks, cash flows and operating models that are brought about by advanced services might be financed, and what the implications are for the financial service providers in the wider economic ecosystem. However, there are key pieces of literature that have been

<sup>i</sup> <https://fintech.global/virtualinsurtechforum/>

<sup>ii</sup> <https://cogx.co>

<sup>iii</sup> <https://fsclub.zyen.com/>

<sup>iv</sup> <https://www.advancedservicesgroup.co.uk>

considered including Neely (2008)<sup>9</sup>, Gomber et al (2017)<sup>10</sup>, Milan et al (2019)<sup>11</sup> and Mention (2019)<sup>12</sup>. Neely (2008) presents a review of the degree of servitisation in manufacturing firms; the review considers 10,028 organisations in 25 different countries. Gomber et al (2017) presents a review of current research in Digital Finance and an overview of directions of possible future research. Milan et al 2019 have conducted a systematic literature review on Fintechs and presents a future research agenda. Mention (2019) also reviews previous academic work regarding Fintech, activities in industry and considers the future of the sector.



## 5. The Financial Servitisation Ecosystem

Our research has shown that a complex financial and material ecosystem exists with many different stakeholders each with their own needs and requirements which change as servitisation develops and extends. The principal actors that we have identified within the financial servitisation ecosystem are: the Original Equipment Manufacturer (OEM), the operator, the end customer, banks, asset financiers, investors, insurers and regulators.

Although the actors are likely to remain the same in the new financial servitisation ecosystem, there will be explicit and implicit changes in roles and responsibilities. The financial system needs to move from selling and financing products to providing and financing a service within a new set of ongoing relationships between OEM, operator, end consumer and financial services. A service-orientated model, based more on operating expenditure, replaces the traditional goods model that is based on financing capital. This transition is illustrated by the model depicted in figure 2.



The adoption of advanced services by the OEM changes the way that ownership and risk move within this asset and finance chain. The OEM makes the asset and provides the service of that asset to the operator. The OEM's finance provider now needs to provide working capital for a longer period and cover the risk of intermittent cash flows to the OEM from the operator. The operator is now paying for the asset through operating expenditure rather than capital expenditure and needs different funding from his financier. The OEM financier needs to understand technical operating risks of asset to be able to price and match cash flows, and to be able to lay off this risk with an insurer. What is now being insured is likely to be ongoing performance rather than, for example, cash for the asset to be replaced.

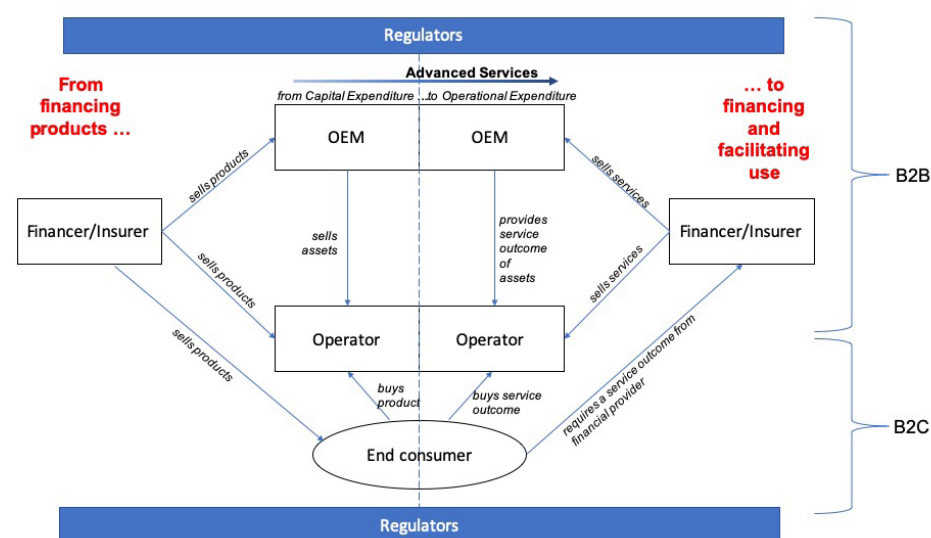


Figure 1: The financial servitisation ecosystem

## 6. Future Research Agenda

Our initial research findings have identified the stakeholders and relationships that exist in the financial servitisation ecosystem (i.e., the ecosystem that is needed to facilitate advanced services in the Digital Economy). However, much more research is needed to provide a deeper understanding of the financial services ecosystem and facilitate the transition from financing products and purchase to financing service and use, and thus allow the finance sector to thrive in the Digital Economy. We propose an initial research agenda to do this, which can be captured by a number of linked themes: understanding risk, levels of servitisation, payment and pricing models, the impact of innovative digital technologies, the need for partnerships, the role of the regulator, redesigning financial services and the need for collaboration.

### Understanding risk

Banks must take into consideration various risks (both internal and external). The insurance companies must also consider what risks are insurable and which are not. Three key financial risks that are listed by the Bank of England are: operational, market and credit. Market risk is when a change in circumstances or price affect the value of assets or investments (e.g., the oil price falls, or planes stop flying). Operational risk is due mainly to bad management (e.g., miss-selling, bad data practices, poorly designed and expensive processes, or bad strategy). Credit risk is when debt, the money lent by the bank to its customers, is not repaid due to a variety of reasons. Banks generally seek to mitigate this through collateral (taking a charge over the customer's assets as in a mortgage), or covenant – is the customer (e.g., the OEM) able to service this loan, through cash flows and the strength of its balance sheet.

Servitisation involves changing risks and the location of those risks and who they will impact. Our research has shown us that the three risks outlined by the Bank of England do not cover all those that exist in the financial servitisation ecosystem (e.g., one must also now consider technical operating risk). Further research is needed to identify the different risks that exist in the new ecosystem from both a finance and an insurance perspective.

Servitisation brings all the risks into play for all of the actors - the OEM, the operator, and their respective financiers, as capital expenditure turns into

operation expenditure. ; as lump-sum payments and receipts arising from asset sale and purchase turn into cash flows arising over a much longer period and all the actors are incurring risks over a longer period of time. This leads to increased uncertainty and the need for increased technical knowledge on the part of the financier. For instance, the OEM has taken on a new financial risk of the operator not paying in full for the cash price of the asset. The OEM financier now has two “customers” with whom they are explicitly and implicitly in an ongoing relationship, as well as a “relationship” and risk with the asset and its technical performance.

Risks that are traditionally held and intermediated by banks and insurers are now more likely to be shared around the system. Financing the Digital Advanced Services Economy becomes an exercise in risk identification management mitigation and reduction. The question arises as to what risks do each of the actors in the ecosystem carry and how do they affect each other? This new set of relationships needs new thinking and skills across the ecosystem.

### Servitisation specific to Financial Services

This paper has focused on the industry perspective with the aim of identifying the ecosystem that is needed to facilitate advanced services. In the academic literature different levels of servitisation have been identified<sup>5,6</sup> but not with a specific focus on the financial services sector. We are currently exploring a wiser academic point of view and identifying groups who may wish to contribute to this work. Future research should establish the relevancy of the different servitisation levels to the financial services sector and whether any more levels exist. It should also be established of how these levels and opportunities develop over time. Consideration should also be given in future research to the two activities that have been identified has a necessity for financial service providers (i.e., how they themselves should adopt an advanced services model for their own organisation offerings; and, what they must do to support their customers who wish to move to an advanced service model). When considering how financial providers might adopt an advanced services model for their own organisation, research is needed to understand what suitable data-driven and customer desired outcomes might exist.





### Payment and pricing models

Different payment models can be found within existing literature (e.g., access-based, subscription models, on-demand models and performance models). Research is needed to understand how these might relate to finance providers who are adopting a servitisation model themselves and how finance service providers might support those customers who are adopting a certain payment model themselves. How do levels of servitisation match these payment models and payment flexibility? Research is also needed as to how the different risks might be accounted for in the pricing models.

### The need for partnerships

It is likely that a single organisation will be able to both adopt an advanced

services model and finance everything themselves; strategic partnerships will be required. In advanced services model, collaborations are necessary typically with “several providers” needing to co-operate to support complex services, “forming partnerships around specific contracts”<sup>6</sup>. As it has been noted, a number of stakeholders exist within the ecosystem, occurring in a network rather than a dyadic chain commonly analysed in supply chains. Research is needed to understand the roles of both finance and insurance providers and how these collaborations might work in the complex network that exists within the financial servitisation ecosystem.

### The role of the regulator

The financial services sector is heavily regulated and involves a multitude

of different regulatory bodies. What will their role be in the future financial servitisation ecosystem? How can we ensure that regulation does not inhibit innovation in the sector? How can we ensure that regulation evolves to keep pace with the dynamic nature of the sector? What is the relationship with work that is being undertaken in FinTech and RegTech?

### Impact of digital technologies – data-driven finance and insurance

Advanced services and the Digital Economy are data-driven. The financial servitisation ecosystem will need to reflect this with data-driven finance. What would data-driven finance look like for different stakeholders in the ecosystem network? How does data, money and risk relate to each other? How might innovative digital technologies be able to identify and mitigate the different risks? If advanced services model involves regular maintenance of an asset, what is the difference between time-driven and data-driven maintenance when considering the different maintenance models? How does this impact the revenue model?

### Redesigning financial services

How do we redesign financial services for advanced services around solutions, outcomes, relationships, network partners and the ecosystem whilst taking into consideration the different risks that exist within the ecosystem?

### The need for collaboration – removing the silos

Much of the research analysis and conversations about the impact of advanced services on the financial services sectors appears to be occurring within silos, looking more at form than function. If the financial servitisation ecosystem is to be realised, it is important that those researching and working in the area do not keep working in silos. Industry and academics must work together in the co-creation of value.



## 7. Conclusions

The research reported here explores what the future of the financial services sector might look like as we move from financing products and purchase, to financing service and use. Financial Service providers have a key role to play in stimulating the move to advanced services, as part of their function in financing the Digital Economy. If servitisation is to succeed in the UK, a new understanding must be developed of the financing of these services, the impact of innovative digital technologies and digitised data and the role of financial services in the Digital Economy. Initial research has shown that a complex ecosystem exists with a number of stakeholders, in a network rather than a dyadic chain commonly analysed in supply chains. The future of financial services, the financial servitisation ecosystem, is presented along with a proposed research agenda that will allow the ecosystem to be realised.

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