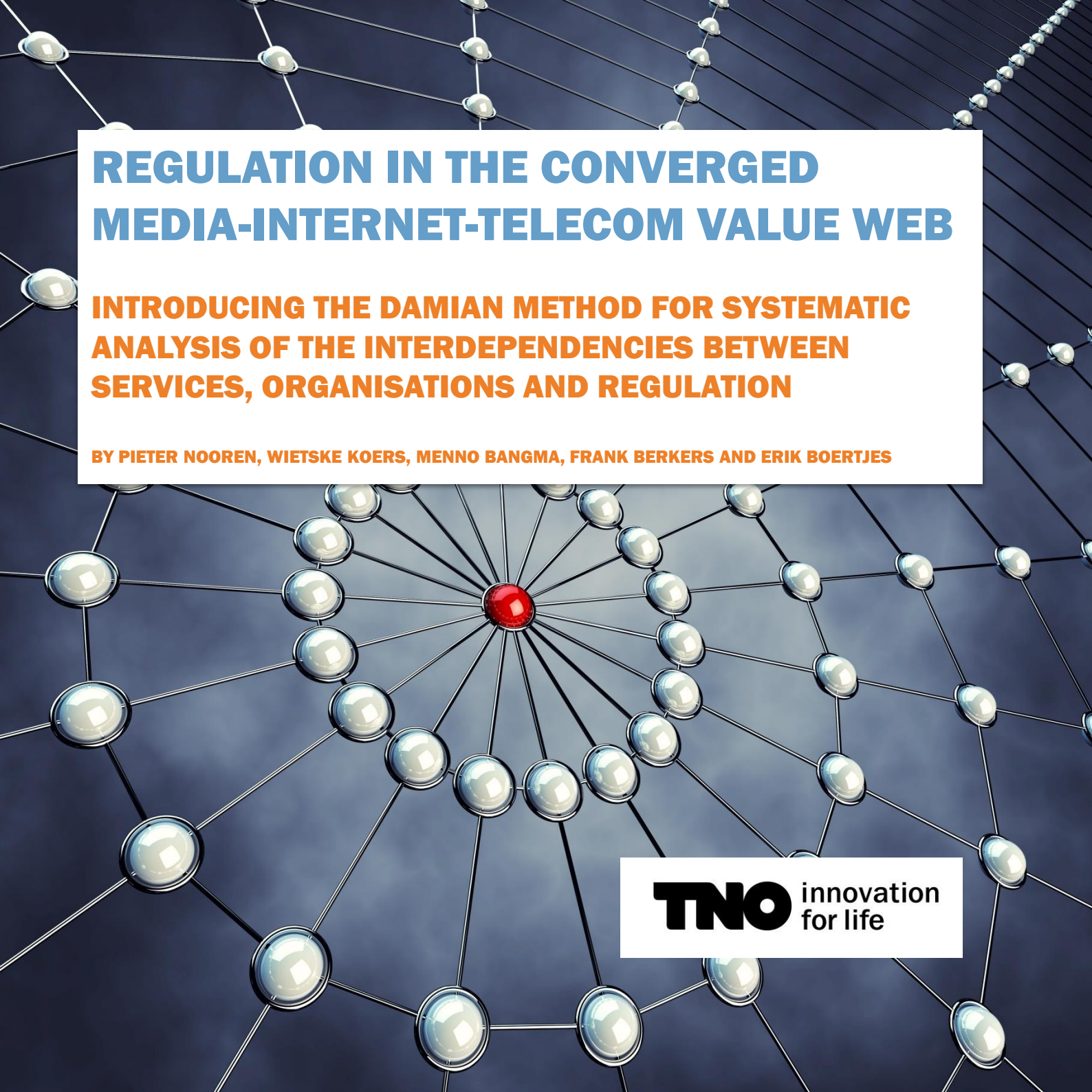

REGULATION IN THE CONVERGED MEDIA-INTERNET-TELECOM VALUE WEB

INTRODUCING THE DAMIAN METHOD FOR SYSTEMATIC ANALYSIS OF THE INTERDEPENDENCIES BETWEEN SERVICES, ORGANISATIONS AND REGULATION

BY PIETER NOOREN, WIETSKE KOERS, MENNO BANGMA, FRANK BERKERS AND ERIK BOERTJES

TNO innovation for life

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TNO REPORT R11428, OCTOBER 2014

TNO innovation for life

EXECUTIVE SUMMARY

The convergence between media, internet and telecoms has brought many new services, devices and distribution models. One of the key outcomes of convergence is that the traditional value chain has evolved into a *value web*, with multiple, parallel routes that services can follow between creation and consumption. The availability of multiple routes for delivery of services to end users helps to remove a number of traditional bottlenecks. At the same time, new bottlenecks can appear as the routes bring new technical and business dependencies between organisations in the web. The dynamics in the value web are also affected by various types of regulation. The analysis in this white paper shows that services that are very similar to end users can be subject to different regulations, depending on the route through the value web and the organisations involved. This is one of the challenges that policy makers and regulators face when they aim to adapt regulation to technical and business developments.

In this white paper, we introduce the DAMIAN™ method that TNO has developed for the systematic analysis of the converged value web, including the effects of regulation. This is done by identifying the roles that organisations have, their roles and activities, the markets in which they operate, the assets that they own and the assets that they need to obtain from other organisations in order to offer their services. This leads to an integrated view of influence and interdependencies and how these are affected by regulation. Every step in the DAMIAN method reflects the crucial transition from value chains to an integrated value web.

The DAMIAN method has been successfully applied in workshops with many stakeholders, including operators, content providers, ministries, regulators, device makers and consumer interest groups. In the workshops, DAMIAN has been used to analyse interactive television services, video distribution in general and neutrality throughout the value web. In this paper, we illustrate the DAMIAN method by applying it to a new case: recommendation services for audiovisual content, again based on inputs provided by a variety of stakeholders during a workshop.

In their feedback, the workshop participants have indicated that DAMIAN helps to keep all participants ‘on the same page’ in their analysis of a complex value web, resulting in a more productive and efficient discussion. Moreover, they state that the careful scoping in terms of end-user services helps to prevent a short-sighted analysis focused at points that happen to receive media attention at the time of the analysis. Finally, the discussion on openness and alternatives for assets brings a deeper understanding of the different views among the participants.

Based on their experience with the DAMIAN method and tool, most of the participants expect that they will apply the method themselves or will be involved in DAMIAN analyses of other cases.

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1. INTRODUCTION

The convergence between media, internet and telecoms is a game changer that has brought many new services, devices and distribution models. As a result of convergence, services that look similar to end users can take very different routes through the value web. For example, the catch-up services for TV content offered by triple-play providers, broadcasters and on-line video service providers use different business models and distribution routes to reach end users.

Zooming in, we see that many organisations are involved in the co-existing routes between creation and consumption. The organisations cooperate and compete at the same time and, as a result, they depend on one another in complicated ways. Another key observation is that although the services are very similar and compete for the same end users, they can be subject to different regulation, depending on the route through the value web and the organisations involved.

In this white paper, we introduce the DAMIAN method that TNO has developed for the systematic analysis of the converged value web. The first aim of the DAMIAN method is to identify and unravel the many interdependencies between organisations in the web. Second, DAMIAN determines how regulation affects the interdependencies and the conditions in which organisations offer their services.

A core activity in the DAMIAN method is the visualisation of service delivery routes, organisations, assets and regulation in the value web. Step-by-step, these crucial components are identified and recorded in the graphical DAMIAN tool to build a comprehensive value web for the case under consideration. Then, filters and selections can be applied to investigate interdependencies and assess the effects of (new) policies and regulations.

In section 2, we first explain the background of the converged media-internet-telecom value web by looking at different service and distribution models for catch-up TV services offered by different providers. Then, in section 3, we introduce the DAMIAN method and illustrate it step-by-step using the case of personalised recommendation services for video content.

The DAMIAN method and tool have been developed in two projects by TNO, partially co-funded by the Dutch public broadcaster NPO and the operators Ziggo, UPC, Vodafone and KPN. DAMIAN has been applied in workshops with many additional stakeholders, including other operators, content providers, ministries, regulators, device makers and consumer interest groups, which have provided value inputs for the approach. TNO is responsible for the content of this whitepaper and the way the inputs from the stakeholders have been used in its development.

PLEASE NOTE THAT THE SERVICE DELIVERY ROUTES AND COMPANY LOGOS SHOWN IN THIS WHITE PAPER ARE FOR ILLUSTRATION PURPOSES ONLY

2. FROM VALUE CHAIN TO VALUE WEB: CONVERGENCE BETWEEN MEDIA, INTERNET AND TELECOM

2.1 CONVERGENCE BETWEEN MEDIA, INTERNET AND TELECOM

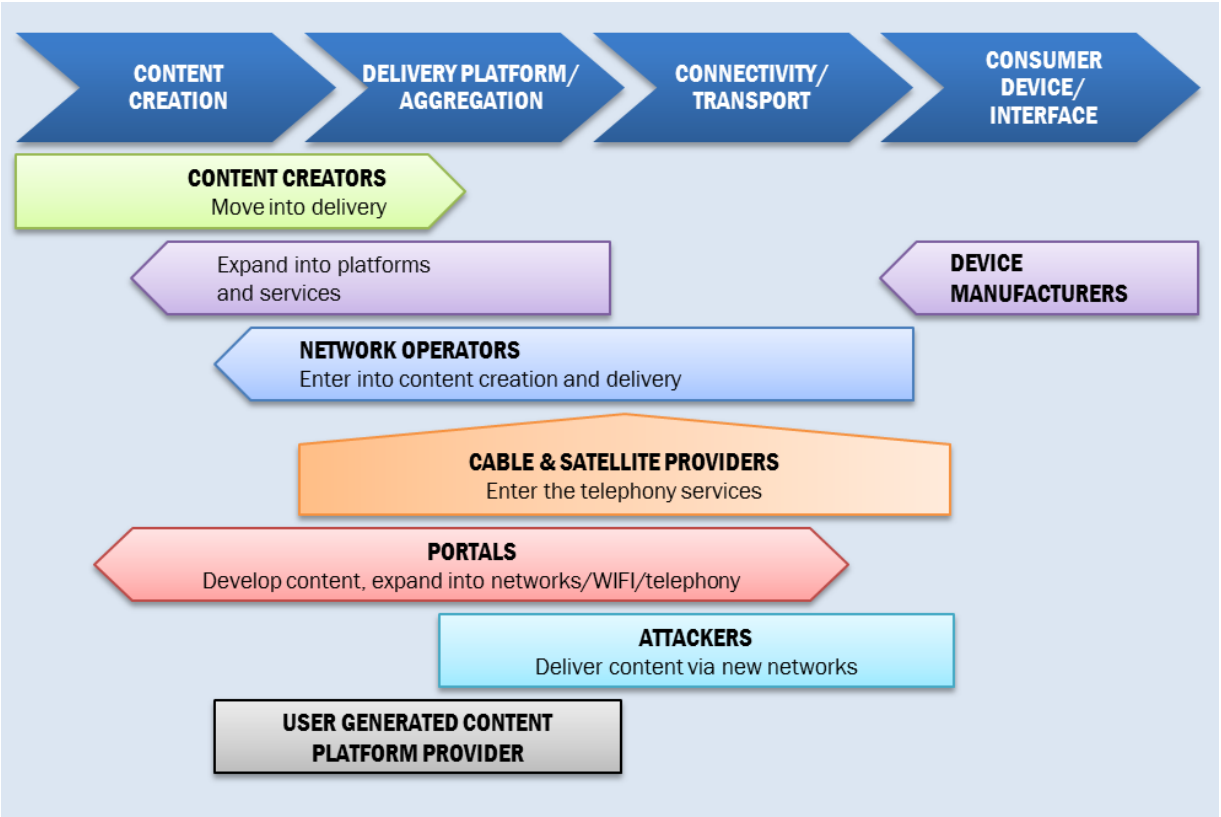
The convergence between media, internet and telecoms has brought many new services, devices and distribution models. Attracted by the large customer groups that can be reached over the internet, device vendors (such as Apple and Samsung), media organisations (RTL, Netflix) and service providers (Google, Microsoft) have enriched the ecosystem with various combinations of hardware and software, such as smartphones, tablets, content delivery networks and cloud infrastructures. These organisations provide media and communication applications themselves, but also enable other organisations, small and large, to develop and distribute their own applications.

As a result, many new technical and business relations have developed in this ecosystem at the level of networks, services and markets. This has profoundly changed the way in which content and services are produced, distributed and used. Organisations in the converged value web actively search for technical and commercial opportunities that present themselves in order to gain a competitive advantage. They carefully position their services and devices in the converged media-internet-telecom web, well aware of the competition they face from organisations that used to operate in other, previously separate markets (Figure 1).

Policy makers and regulators face the challenge to keep up with the ongoing developments and adapt regulation to new technologies, services and commercial models. This is not an easy task, as regulation is, for historical and institutional reasons, still largely aimed at the three separate sectors. Moreover, media and telecoms, with their longer history, are generally subject to more sector-specific regulation than the internet.

Policy makers at the European and national level are seeking input from stakeholders in the media-internet-telecom value web on the way to proceed [1,2,3]. The consultations and the many reactions they have generated show the complexity that policy makers face. In their considerations on the formulation of policies and, where needed, regulations, they need to take into account many new varieties of services and applications, provided by many organisations that typically use their assets to perform multiple activities in different roles and markets. Examples of assets are content rights, an internet access network, a large customer base and an operating system on a mobile device.

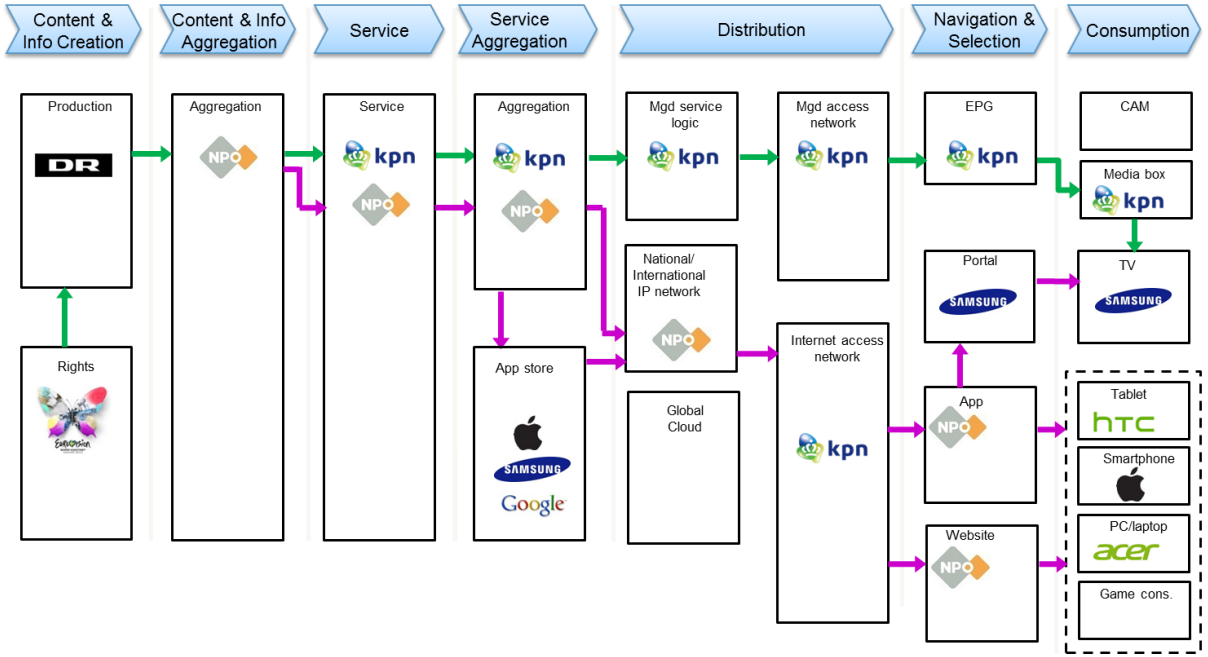
FIGURE 1. MOVEMENTS AND EMERGENCE OF PLAYERS IN THE DIGITAL ECOSYSTEM (FROM WORLD ECONOMIC FORUM [4]).



2.2 CONVERGENCE IN PRACTICE: DELIVERY OF VIDEO SERVICES TO CONSUMERS

To get a better understanding of the impact that convergence has on market structures, we zoom in on the various ways in which catch-up TV and Video on Demand (VoD) can be delivered to consumers. Just as in the traditional media value chain, the video content is created, aggregated, distributed and consumed. This familiar flow is shown in the top of Figure 2, together with three new activities which prove to be important in the converged market: service, service aggregation and navigation & selection. This flow is the traditional way to describe the creation and delivery of products and services as a linear chain of activities, in which each step adds value to the offering [5]. However, it will become clear that this linear chain can no longer adequately capture the dynamics in the converged market.

FIGURE 2. VARIOUS ROUTES FOR MANAGED AND OVER-THE-TOP DELIVERY OF CATCH-UP TV CONTENT FROM THE EUROVISION SONG CONTEST.



First, we look at the different ways in which consumers can watch catch-up TV. We use the example of Dutch viewers of the Eurovision Song Contest. In the *content & info creation* zone on the left, the figure shows a single green route for the Eurovision content starting from the European Broadcasting Union (EBU), that owns the rights to the Eurovision song contest format. The 2014 edition has been produced by Danish public broadcaster DR. In the Netherlands, the song contest was broadcasted live by the public broadcaster NPO. In order to do so, NPO has aggregated the song contest together with other TV programs on one of its linear TV channels (*content & info aggregation*). After the live broadcast has occurred, there are two main routes for the distribution of the videos from the contest: the green and the purple route.

THE MANAGED ROUTE

The first route, in green, is what we call the managed route. Here, a TV service provider, such as KPN in the Netherlands, offers a catch-up *service* as a part of its digital TV package. The consumer buys access to the catch-up service through a TV subscription, which is often part of a triple-play offer that combines TV, internet access and telephony *(service aggregation).* KPN *distributes* the catch-up TV using its own TV platform and managed network. In this context, 'managed' means that there is a guaranteed reservation of network capacity for the distribution of the catch-up TV service. The consumer can *navigate & select* the catch-up TV videos from the Electronic Program Guide (EPG) running on a media box (often called a Set-Top Box) supplied by KPN. In this example, the media box is connected to a smart TV from Samsung that a consumer uses to watch the video *(consumption)*.

THE OVER-THE-TOP ROUTE

The second route is an over-the-top (OTT) route, shown in purple. In this route, users go to the NPO website to access the catch-up service. Thus, the end-user *service* is offered by the broadcaster, NPO, rather than by the TV service provider, KPN. NPO also offers this service via apps for a variety of smartphones, tablets and smart TVs. Consumers typically download the app they need from the app store associated with their device's operating system. In this context, app store providers, such as Apple and Google, are also service aggregators in the sense that they offer many different services in a uniform way in their stores. For the purposes of this example, we assume that NPO plays out its own catch-up videos and also has an IP network infrastructure to deliver the videos to the so-called eyeball Internet Service Providers (ISPs). We also assume that the consumer has a triple-play package from KPN, so that

the NPO's catch-up video is delivered to the consumer over the KPN internet access network. Note that in this triple-play example, the KPN network provides the connectivity for both the managed route and the OTT route to the consumer's home. The internet access network offers a so-called 'best-effort connectivity', meaning that the quality is usually good but not guaranteed, as there is no reservation of network capacity for the catch-up videos. Consumers can choose from many devices to navigate, select and view OTT catch-up TV. They can watch videos by visiting the NPO website on their PC, laptop or tablet or download the NPO app for their smartphone or tablet. There is also an NPO catch-up TV app for the Samsung smart TV. And, of course, within one household, two or more of these modes of consumption can be used in parallel.

THE VALUE WEB IS RICH IN ROUTES

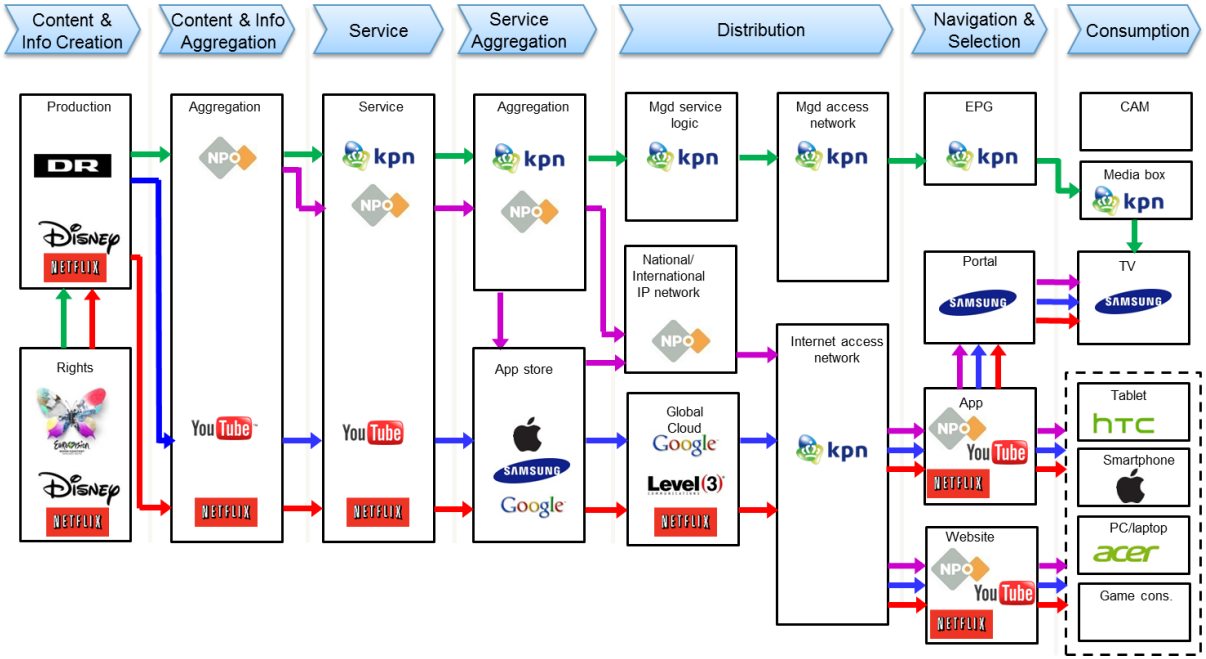
The catch-up TV services offered by TV service providers and broadcasters already lead to a rich set of possible routes and consumption modes. However, the set of routes in Figure 2 is by no means exhaustive. For example, some TV service providers also bring their catch-up service to tablets and smartphones, using their internet access networks to stream video from their TV platforms to their apps running on these devices. Furthermore, the OTT routes can also be provided over mobile networks, adding mobile network providers to the value web. Figure 3 shows yet another relevant route (in blue): catch-up videos from the Eurovision Song Contest are also available on YouTube via a dedicated Eurovision 2014 channel. Thus, a third service provider for this content is available in parallel to the two discussed earlier: consumers can watch the Eurovision videos by visiting the YouTube website or by using the YouTube app for their smartphone, tablet or smart TV. In the YouTube route, the videos are played out from Google's global cloud infrastructure and distributed further over the internet access network.

Finally, Figure 3 shows a route for Netflix (in red), as an example of an OTT VoD provider. Netflix aggregates content from multiple content providers (e.g. Disney) and self-produced content into an on-line catalogue. Netflix distributes its videos to the internet access networks using a combination of its own global infrastructure and content delivery networks provided by others (*e.g.* Level3). The Netflix VoD service competes with other OTT VoD services that follow routes similar to the red one. OTT VoD providers also compete with VoD services provided by TV service providers.

We would like to point out three important messages that follow from Figure 3:

1. In the converged value web, there exist multiple routes for the delivery of the same content to the same consumers.
2. Organisations from previously separated domains compete with similar services in the converged media-internet-telecom market. In the figure this convergence becomes apparent in the service column, showing a TV service provider (KPN), broadcaster (NPO) and on-line video service providers (YouTube, Netflix) as VoD service providers.
3. All routes for video content delivery depend on the availability of assets from multiple organisations. This leads to a multitude of interdependencies between the organisations in the value web.

FIGURE 3. VARIOUS ROUTES FOR CATCH-UP TV CONTENT FROM THE EUROVISION SONG CONTEST (IN GREEN, PURPLE AND BLUE) AND A ROUTE FOR VOD CONTENT FROM AN ON-LINE SERVICE PROVIDER (IN RED).



2.3 THE MANY TYPES OF REGULATION IN THE CONVERGED VALUE WEB

The development of new services, applications and distribution models is also subject to various types of regulation. As explained earlier, the influence of regulation on the development of the value web is explicitly included in the DAMIAN method. The converged value web brings together regulation from, primarily, the telecoms and media sectors.

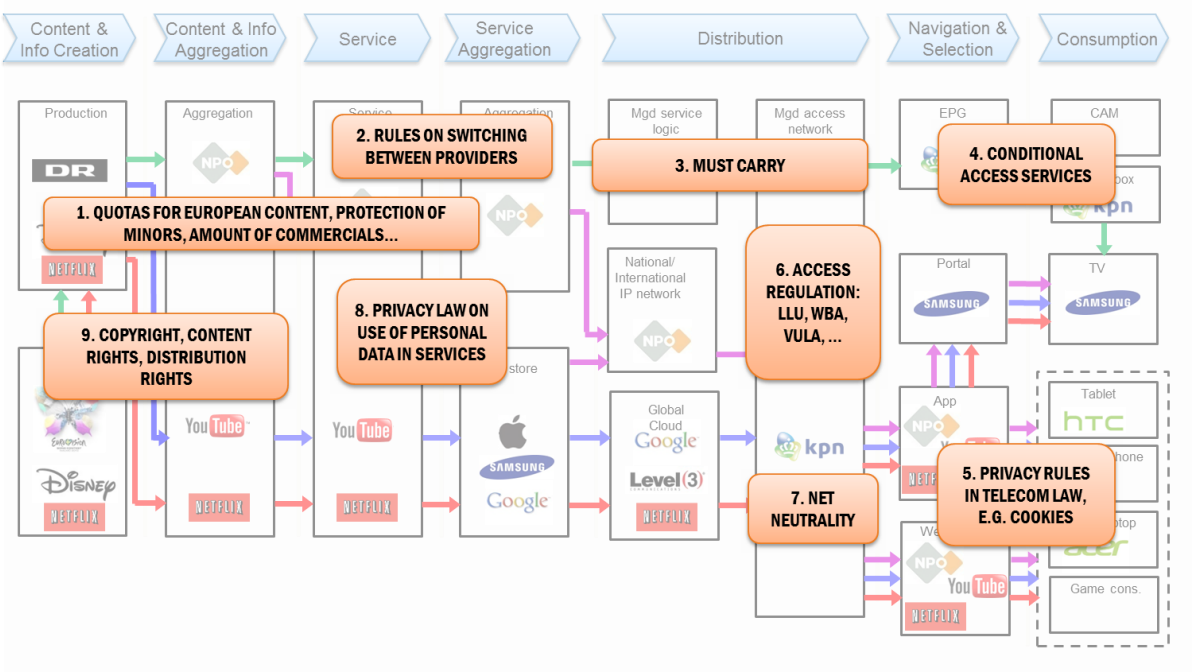
UNDESIRABLE AND UNINTENDED EFFECTS OF REGULATION

Sector-specific regulations intended to promote the objectives of media, telecom or internet policies typically subject specific services or organisations to specific rules. This often does not match the dynamics in the converged value web. For example, broadcasters who make their content available through on-line channels have to comply with rules on the amount of commercials and protection of minors, while other providers of on-line video services are not subject to these rules. Another example, from communications services, is the access to the 112 emergency service. Organisations that provide a traditional fixed or mobile telephony service have to offer 112 access, while their competitors that provide an over-the-top VoIP service do not have this obligation. The background of such obligations is clear, but it is also clear that their sector-specific implementation can have unintended and undesirable effects. They can be at odds with the creation of a level playing field for organisations from different backgrounds that offer similar services. Moreover, they can stimulate organisations to seek ways to avoid regulation by opening up new routes through the value web.

Figure 4 shows some of the key classes of regulation that are important in the value web for video, together with the approximate area in the value web where they apply.

1. Rules related to the content provided in audiovisual services, such as (minimum) *quota for the amount of European content* in the programming of public broadcasters, on the *protection of minors* from harmful content and on the *amount of commercials* in linear programming. These rules originate from the European Audiovisual Media Services Directive [6].
2. Rules that aim to lower the barriers for end users to *switch between providers*. The European Commission's Connected Content proposal [7] complements the long-standing number portability obligation in the European universal service directive [8] with rules that apply to service bundles (triple play, quadruple play).
3. *Must-carry rules* that oblige providers of TV packages to transmit certain TV channels (*e.g.* the channels of the public broadcaster), based on the European universal service directive.

FIGURE 4. REGULATIONS THAT AFFECT VIDEO SERVICES IN THE CONVERGED VALUE WEB.



4. Rules on *conditional access* services. These older rules from the European conditional access directive [9] were developed to promote the development of pay TV services based on conditional access through the single market.
5. Rules on transparency and end-user consent for "*cookies*". The cookie rules, originating from the European e-Privacy directive [10], determine how service providers can use cookies and other technologies to store information about users on their devices.
6. Local Loop Unbundling (*LLU*), Wholesale Broadband Access (*WBA*) and Virtually Unbundled Local Access (*VULA*) are among the wholesale access remedies that can be imposed on network operators with significant market power. The *access regulation* is based on the European Access Directive [11] and the associated list of relevant markets [12].
7. The current universal service directive deals with *net neutrality* through transparency provisions that aim to give end users a meaningful insight into the traffic management methods employed by network operators in their internet access services. In the Netherlands, the transparency has been complemented by explicit no blocking/throttling rules and rules that prevent tariff discrimination based on the OTT applications that end users choose [13,14]. The European Commission's Connected Content proposal contains similar (but not identical) rules.
8. The regulatory context for protection of *privacy* is provided by the European data protection directive [15]. This 1995 directive is currently in the process of a major reform with a view to bring more control of end users over their personal data in the vast amount of services and applications provided in digital ecosystems, such as the internet-media-telecom value web.
9. The legal basis for *copyrights* in the European Union is provided in the Copyright Directive [16]. Based on this directive, content creators, aggregators and service providers enter into commercial agreements on the right to distribute content and make it available to the public.

NEED FOR A NEW METHOD TO UNDERSTAND THE EFFECTS ON REGULATION IN CONVERGING MARKETS

Figure 4 illustrates why it is important to take regulation into account when looking at the service delivery routes through the value web and the interdependencies between organisations. Regulation has an effect on the way organisations in the converging markets can leverage their strategic assets, such as their content, network, or customer base. By doing so, regulation affects the balance of power between organisations in the web. Figure 4 also shows that services that look very similar to end users can be subject to different types of regulation, depending on the route through the value web and the organisations involved. This seems to be at odds with the level playing field that many organisations favour.

The figure also shows that it is not straightforward to assess the consequences of the introduction of new regulations or the removal of existing ones on the overall balance between organisations in the value web. The many interdependencies between organisations can lead to situations in which a rule that seems to make sense at one position in the web can have adverse consequences in other parts.

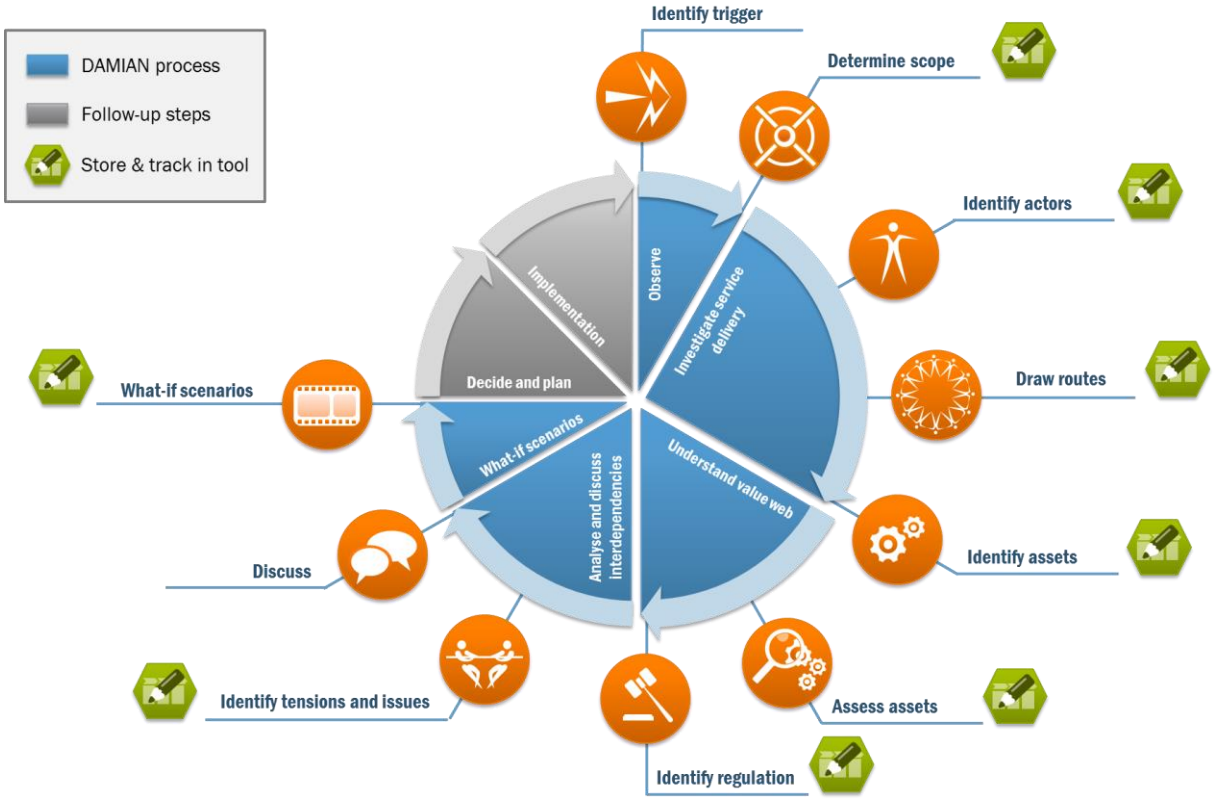
TNO's observation is that all organisations try to build on the strengths of their own assets but, at the same time, are led to share their assets with other organisations by business considerations or regulation. Regulation affects the ways in which organisations can use their own assets and can rely on other organisations' assets, which implies that regulation affects the balance in the value web. This asset-based analysis is at the core of the DAMIAN™ method. DAMIAN is short for Digital Asset Modelling of Interdependencies in Actor Networks. The value web figures with service delivery flows, such as Figure 3, are important intermediate results in DAMIAN that are needed to determine the relevant assets, interdependencies and regulation.

3. INTRODUCING THE DAMIAN METHOD

3.1 THE DAMIAN METHOD AT A GLANCE

Figure 5 outlines the stages and steps in the DAMIAN method. The main objective of the this method is to create a neutral and shared foundation for discussions about policy and regulations in converging markets.

FIGURE 5. THE DAMIAN METHOD AT A GLANCE.



This neutral and shared foundation is based on a systematic analysis and description of the service delivery flows in the value web, consisting of 1) the activities that need to be performed in order to deliver a specific service to the intended end-users; 2) the organisations who carry out these activities; 3) the strategic assets that the organisations use and exchange to fulfil their activities in the value web; and 4) the rules and regulations that affect the positions and interactions in the web. The outcomes of the DAMIAN method are recorded in the DAMIAN tool. Through this method and tool, the many interdependencies between organisations in the web can be unravelled, the complexity of the converging value web can be understood, and the effect of (new) policies and regulations can be evaluated.

In the following sections we will illustrate the use of the DAMIAN method by applying it to the case of personalised recommendation services in audiovisual media. The service delivery flows for audiovisual media recommendations have been defined, analysed and discussed during a workshop with participants from different areas of the media-internet-telecom web, including telecom providers, broadcasters, device manufacturers, consumer interest groups, software developers, regulators and ministries.

3.2 OBSERVING POTENTIAL ISSUES IN THE MEDIA-INTERNET-TELECOM VALUE WEB

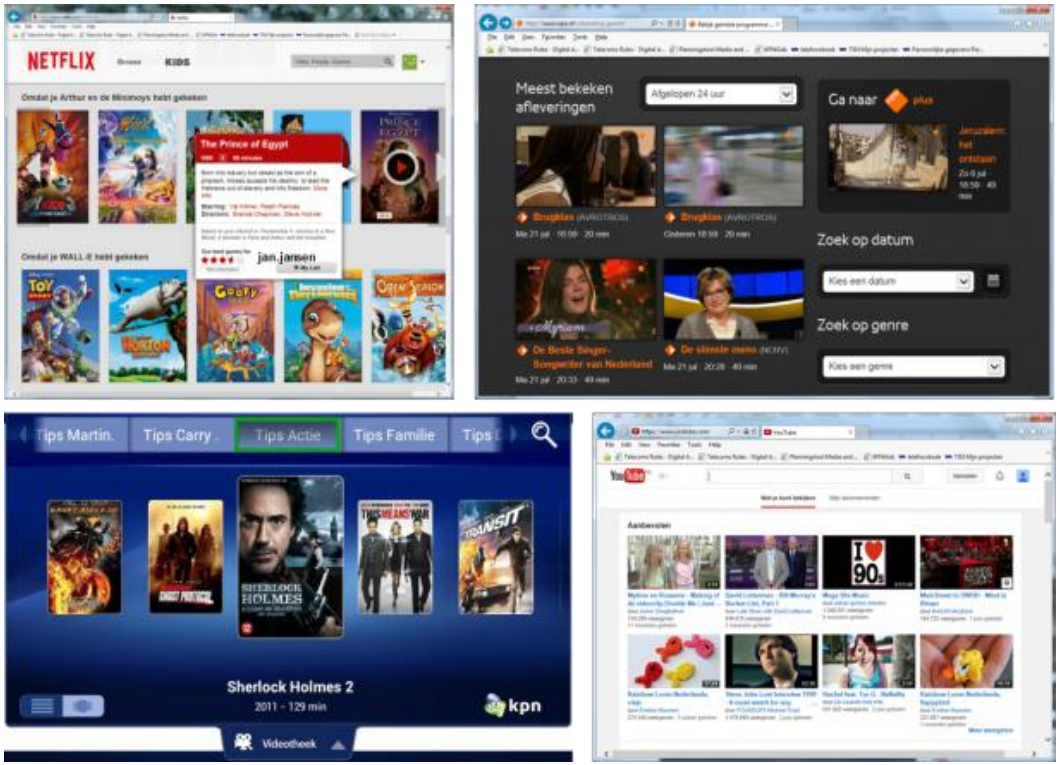
The starting point for the DAMIAN method is a current case that causes (potential) tensions in the media-internet-telecom market. Such tensions can have different causes:

- The emergence of new service delivery flows as suppliers expand their activities in the value web (e.g. cable providers experience competition for their television services from the live and VoD services of media organisations).
- New entrants that offer similar services as incumbent organisations in the web, but under different commercial and regulatory conditions (e.g. over-the-top provider Netflix competes with the television services of cable providers and broadcasters, but may not be regulated by the same rules that apply to traditional media organisations).
- The growing importance of certain strategic assets, which influences the balance of power in the value web (e.g. as personal content recommendations become more important, databases with user profiles on viewing behaviour become more important assets).

TRIGGER: PERSONALISED RECOMMENDATIONS IN AUDIOVISUAL MEDIA

The availability of fast broadband internet access and the arrival of new devices such as tablets and smart TVs have led to many new services and distribution models for TV and video. As illustrated by Figure 3, traditional and new service providers compete for the attention of viewers, often referred to as *eyeballs*. The eyeballs are important as they provide the basis for the business models of the providers, typically based on advertising or subscriptions. One of the approaches that providers use to guide viewers towards their content is to provide them with *content recommendations*, see Figure 6.

FIGURE 6. EXAMPLES OF CONTENT RECOMMENDATIONS PROVIDED BY NETFLIX, NPO, KPN AND YOUTUBE.



In basic recommendation schemes, providers recommend content items based on their overall popularity among their customers. Increasingly, providers are developing more advanced systems for personalised recommendations geared towards the taste of individual customers. Their goal may be to more effectively attract viewers to their content and to prevent them from searching for content in other services. For such personalised recommendations, providers rely on information on their customers' viewing behaviour that they collect as they navigate and watch content. Depending on the route of the services through the value web, usage data are generated in the domain of certain services providers. These service providers are in the best position to make personalised recommendations (e.g., NPO providing recommendations on its catch-up offering, Netflix offering recommendations on content in the Netflix catalogue).

There are now also organisations that provide recommendations across several audiovisual services. Samsung, for example, provides a recommendation service on its recent Smart TV models that covers the content offered in services from multiple providers, such as broadcast TV, VoD, apps and social media [17]. New recommendation service providers may depend on user data from other providers to make their own personalised recommendations. The increasing value of usage data can thus introduce new technical and commercial interdependencies between organisations in the value web.

Apart from the interdependencies that they introduce, personalised recommendations also affect two other areas that are relevant for providers and policy makers:

- The processing and storage of usage data needed for personalised recommendations is strongly related to the *privacy* of the viewers. The protection of personal data in recommendation services is already on the agenda of regulators and policy makers.

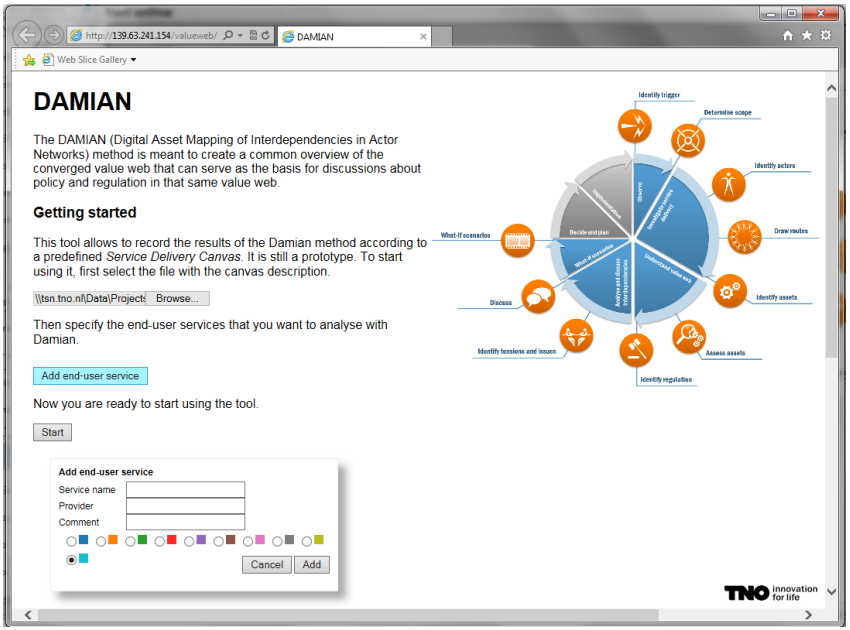
- There are concerns among policy makers that certain content will be more *difficult to find* for viewers. In the converged value web, viewers have a very rich choice in content. At the same time, an additional effort on behalf of the viewer may be required to access content that has a less prominent position in recommendations provided by providers. The concern is that providers will use recommendations primarily to promote content in which they have a commercial interest, thus reducing the visibility of other content.

SCOPE: AUDIOVISUAL RECOMMENDATION SERVICES

After defining the case, it is important to determine the scope for the analysis and record this in the DAMIAN tool. The scope consists of a set of end-user (retail) services and their distribution models that are related to the case and are considered important by the involved stakeholders. They are described by the name of the service and the actor that offers it. It is important not to include too few or too many services in the analysis. Including too few services might result in a very narrow focus on issues that receive a lot of (media) attention at the time of the analysis. Including too many services in the scope results in a very extensive analysis requiring too much time from the participants. A typical DAMIAN analysis includes 3—5 services. In our workshop, the scope for the audiovisual recommendation case was defined by the following services:

- Recommendations by KPN (a service providing recommendations for Live TV, VoD and Catch-up TV);
- Recommendations by NPO (for Live TV and Catch-up TV);
- Recommendations by Netflix (for VoD);
- Recommendations by Samsung (for Live TV, VoD and Catch-up TV);
- Recommendations by Videoland (for VoD).

FIGURE 7. RECORDING THE SCOPE IN THE DAMIAN TOOL.



3.3 INVESTIGATING THE SERVICE DELIVERY: ORGANISATIONS, ROUTES AND ASSETS

The second stage in the DAMIAN method is aimed at clarifying the way in which services are being delivered to the end-user:

- Which organisations are involved?
- Which functional relationships exist between these organisations?
- And which assets do the organisations use and exchange to deliver the service?

The results of this stage are captured in the '*Service Delivery Canvas*' (Figure 8). This canvas depicts the main activities in the web required to deliver services to the end-user. On the following page the entries in the canvas are explained in more detail (Figure 9).

FIGURE 8. THE SERVICE DELIVERY CANVAS.

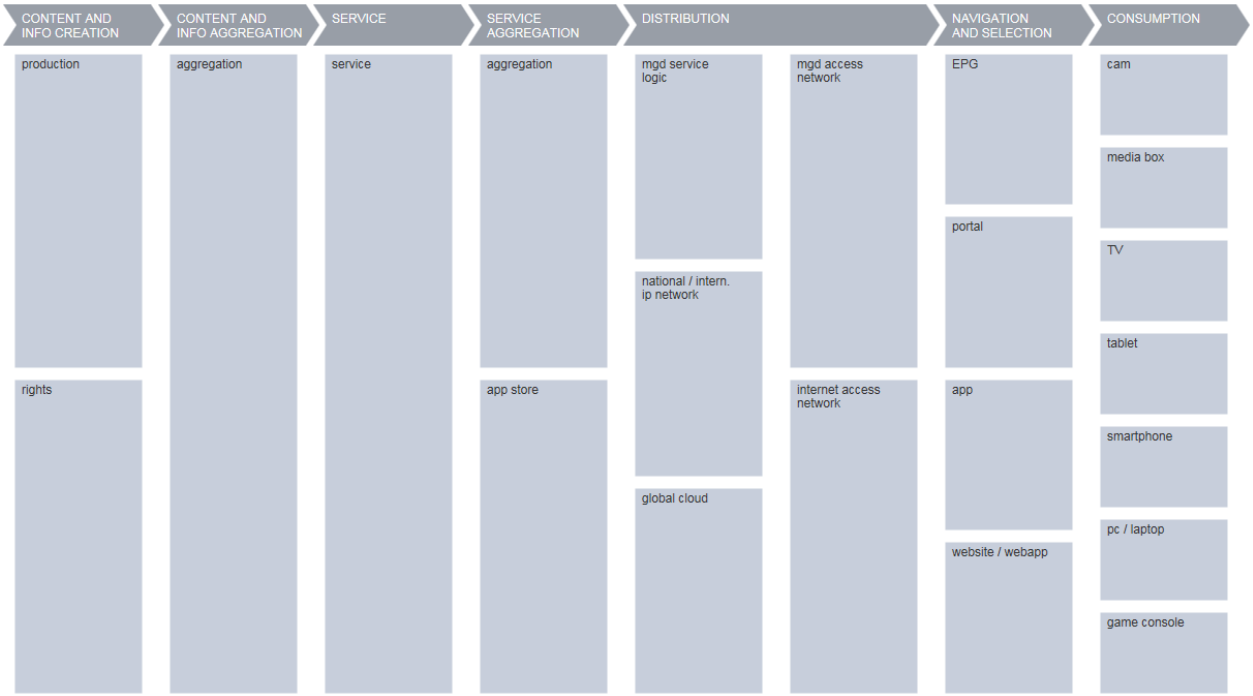


FIGURE 9. THE SERVICE DELIVERY CANVAS EXPLAINED.

SERVICE
In this column, the actor that offers the service to the end-consumer should be recorded.

DISTRIBUTION
Distribution of a service usually involves core infrastructure and access infrastructure.

- The core infrastructure consists of *national and international IP networks*, *cloud* infrastructure and content delivery networks.
- In *managed access networks*, there is a guaranteed reservation of capacity for each service. *Internet access networks* offer so-called best-effort connectivity, meaning that the quality is usually good but not guaranteed.

CONTENT AND INFO CREATION
In most cases audiovisual content is produced based on existing (format) *rights*. During *production,* new rights are often created, such as distribution rights.

Communication services, unlike media services, are not based on content that is produced in advance. The service delivery for these services starts in the service column.

CONSUMPTION
The end user can receive and view content through a *Set-Top Box* or *Conditional Access Module (CAM)* or on a variety of other consumer devices (TV, tablet, smart phone, laptop, PC, game console).

CONTENT AND INFO AGGREGATION
Content is *aggregated* in, for example, TV channels and on-line video catalogues.

SERVICE AGGREGATION
Just like content, services can be *aggregated* (bundled), for example in triple play offers or in *app stores*.

NAVIGATION AND SELECTION
To search and choose between and within services, the end-user can use various software environments, which can be linked to specific devices: *Electronic Program Guides* (EPG) on *Set-Top Boxes* (STBs); *Portals* on Smart TVs and several media boxes such as the Apple TV; *Apps* on smart phones, tablets and smart TVs; and *Websites*.

To create an overview of the service delivery routes, first the organisations and relationships between them are recorded in the canvas. Then, the method zooms in at the capabilities of the individual organisations in the value web by analysing which tangible and intangible strategic assets (e.g. distribution networks, content, brand, customers, etcetera) they control and leverage to capture value in the service delivery route. An organisation gains influence in the value web when its assets are scarce and in high demand by other organisations in the web. Conversely, organisations that are mainly using other organisations' assets to deliver their service to the end-user have a more dependent position.

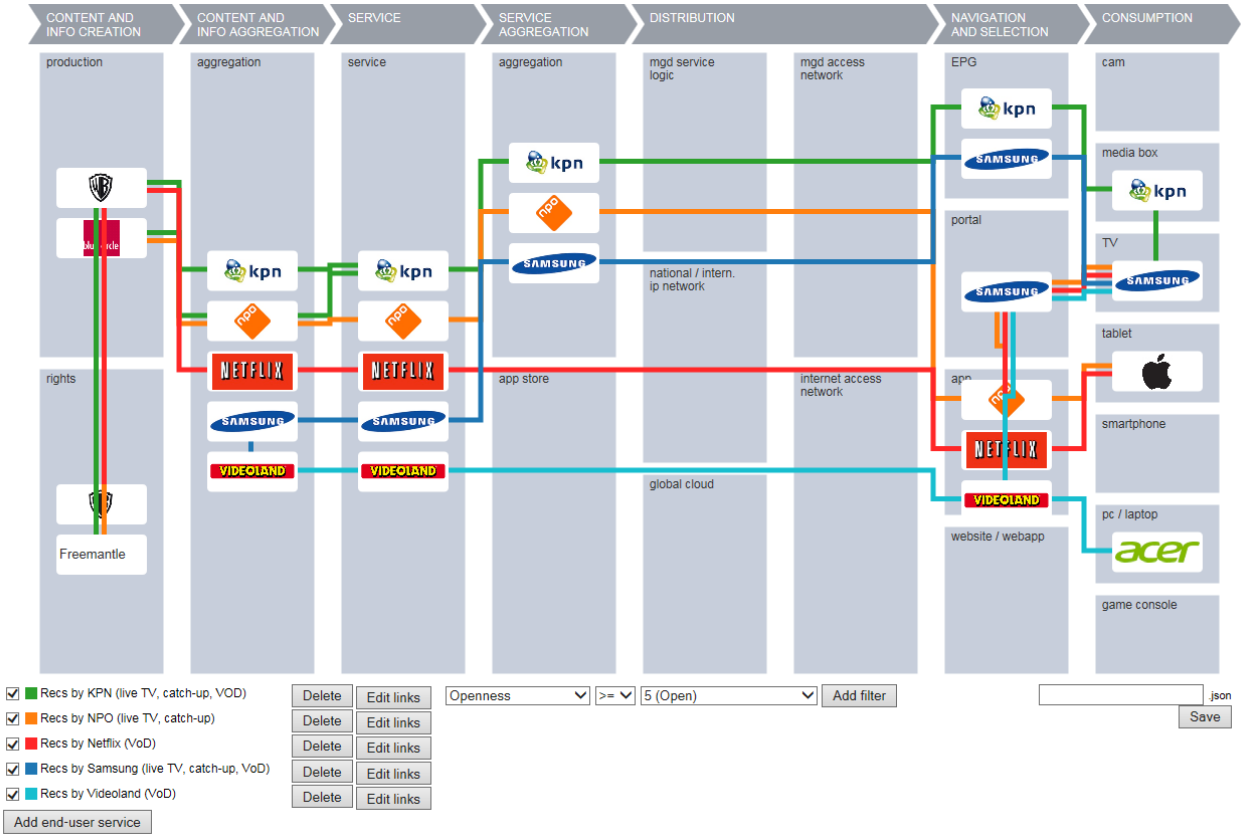
The results for the selected audiovisual recommendation services can be found in Figure 10. The coloured lines show the service delivery for each of the services.

The workshop participants judged the following assets to be the most important ones for the dynamics in the value web, starting from the left column in the figure to the right:

- the content itself;
- metadata about the content;
- data about the viewer;
- the recommendation algorithm;
- cross service recommendations;
- the user interface through which the content is accessed and which determines the order in which content is presented to the viewer;
- data about the viewer's behaviour.

These assets have also been recorded in the tool and become visible when a relevant organisation or service is selected (not shown in the figure).

FIGURE 10. RECOMMENDATION SERVICE DELIVERY ROUTES.



3.4 UNDERSTANDING VALUE WEB DYNAMICS: ASSETS AND REGULATION

To create an understanding of the dynamics in the value web, the DAMIAN method systematically analyses the interdependencies between organisations in the web through their strategic assets and the rules and regulations that apply to these assets. Assets determine where and how organisations can capture value and generate revenues from the web and can exert influence. In other words, assets can provide organisations with *control points*: parts of the value web in which they can project (economic) power [18,19,20]. The influence that an actor can leverage through the asset can be defined based on both the *competitive advantage* of the asset [21,22] and how much it would cost other organisations to obtain the same type of asset [23,24]. Regulation affects the ways in which organisations can control their own assets to exert influence and can rely on other organisations' assets.

In the previous steps of the method, we have already identified the assets that are important and can thus be expected to bring a *competitive advantage* in the delivery of the service. At this stage of the DAMIAN method we zoom in to identify which of the assets can be characterised as control points or gatekeepers. This is done by scoring the assets on two scales (Figure 11):

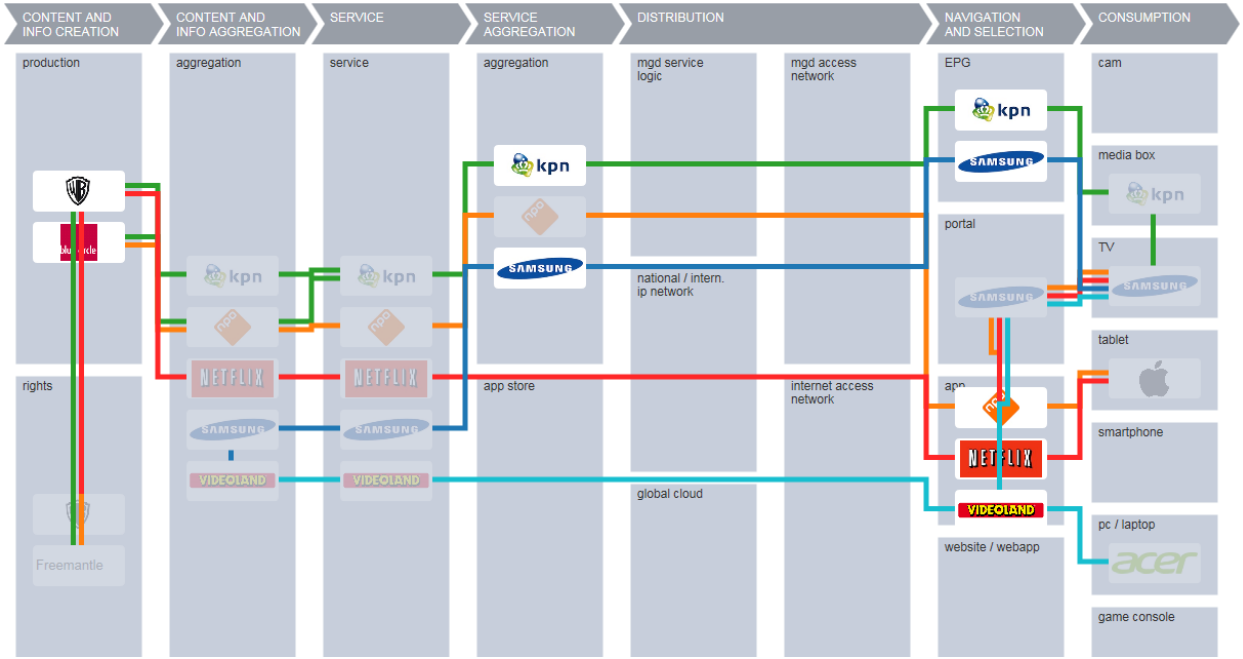
1. How open is the asset for use by other organisations?
2. How may alternatives are available for this asset?

FIGURE 11. ASSET INFLUENCE AND DEPENDENCY BASED ON DEGREE OF OPENNESS AND NUMBER OF ALTERNATIVES.
Note that the assessment of the assets is always done from the perspective of the service provider

3.5 ANALYSING AND DISCUSSING THE INTERDEPENDENCIES IN THE VALUE WEB

By following the preceding steps in the DAMIAN method, a complete overview has been created of the service delivery routes, including the most important assets, their openness for other organisations, the amount of available alternatives and the applicable policies and regulations. In this phase of the DAMIAN method, we use this overview to identify and discuss (potential) tensions in the value web by applying several filters. The filters can combine multiple criteria, such as the openness of the asset, the amount of alternatives, specific policies and regulations, specific services, or disagreements on the openness/alternatives scores between participants in a multi-stakeholder workshop setting.

FIGURE 12. APPLYING A FILTER TO DISCOVER DISAGREEMENT ON SCORES IN THE SERVICE DELIVERY ROUTES.



THE DISCUSSION OF INTERDEPENDENCIES

Again, we look at the case of audiovisual recommendation services. The assets in the service delivery flows have been scored during our workshop through a real-time, anonymous voting system. Figure 12 highlights some of the disagreements that occurred during the workshop, by displaying the logos of the organisations whose assets did not receive a unanimous score on the number of available alternatives. We will discuss some of the workshop insights in more detail below.

Overall we can conclude there is more consensus on the openness of assets than on the availability of alternatives for them. As an example, when we asked the participants to assess the metadata owned by content producers, they scored the openness almost unanimously as commercial/exclusive (Figure 13). However, there was disagreement on the amount of alternatives (Figure 14). In this case the discussion that followed helped to clarify the various scores: Some of the participants knew of the existence of intermediaries for metadata in the marketplace. These intermediaries can offer an alternative for metadata of content producers, depending on the specific content.

FIGURE 13. PARTICIPANT SCORES OF OPENNESS OF METADATA FROM THE PERSPECTIVE OF THE RECOMMENDATION SERVICE PROVIDER.

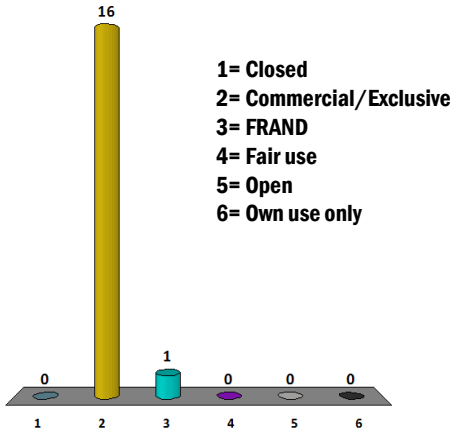
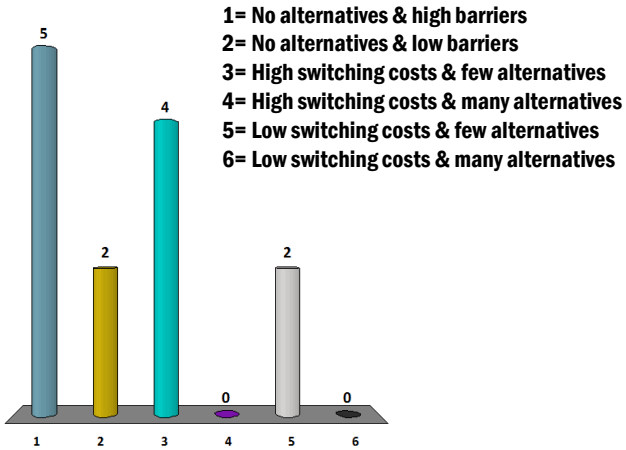


FIGURE 14. PARTICIPANT SCORES OF ALTERNATIVES FOR METADATA FROM THE PERSPECTIVE OF THE RECOMMENDATION SERVICE PROVIDER.



The same type of disagreement was found when scoring the openness and alternatives for the user interface that guides the viewer to the content. Again, the participants agreed that the openness was commercial/ exclusive, but there were different views on the amount of alternatives based on the question whether or not viewers are likely to switch portals and/or software environments to reach content.

Another interesting insight is found when we look at another core asset for providing personalised recommendations: the data on user viewing behaviour owned by the service providers. This was almost unanimously scored as a closed asset with no alternatives (Figures 15 and 16). The service providers that own this asset originate from different domains, as we can see in Figure 10. They can be triple-play operators (e.g. KPN), broadcasters (e.g. NPO), device manufacturers (e.g. Samsung) or new OTT providers (e.g. Netflix). The workshop participants expect that this asset will become part of further discussions about (new) policies and regulations. A key insight is that ownership and control over user profile data assets is not concentrated, as is the case for a number of other assets. Instead, multiple service providers have their own databases of user profile data.

As we can see from the scoring examples, the assessment of the assets is dependent on the perspective of the assessor. It is important to note that the DAMIAN method does not aim to come to a single 'right' score. The scores provide a means to start the discussion about interdependencies in the web. This discussion is as important as the scoring that precedes it.

FIGURE 15. PARTICIPANT SCORES OF OPENNESS OF VIEWING BEHAVIOR DATA FROM THE PERSPECTIVE OF THE RECOMMENDATION SERVICE PROVIDER.

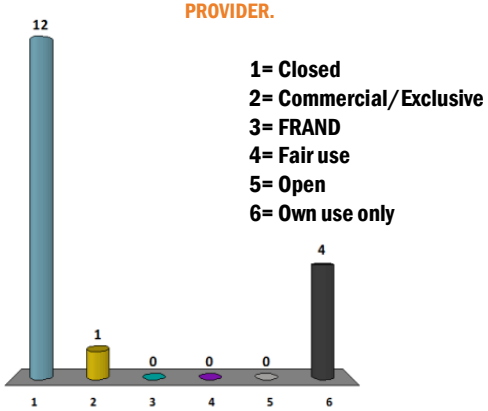
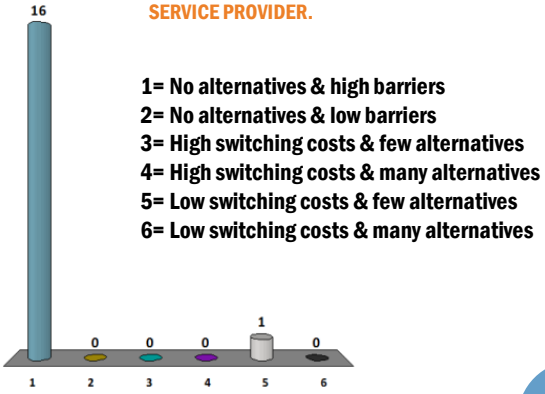


FIGURE 16. PARTICIPANT SCORES OF ALTERNATIVES FOR VIEWING BEHAVIOR DATA FROM THE PERSPECTIVE OF THE RECOMMENDATION SERVICE PROVIDER.



3.6 "WHAT IF..."–SCENARIOS AND FOLLOW-UP

The what-if scenarios in DAMIAN represent an optional step that provides a link between the joint effort to develop a shared view of the value web and the decision making within individual organisations and regulators. A joint discussion of what-if scenarios provides a way to 'test the water' with initial thoughts on ways forward, against the shared background in the value web. In the end, the follow-up actions are decided by individual organisations and regulators. This step is intentionally not covered by the DAMIAN process. Of course, in their decision making, all stakeholders benefit from the insights they have obtained in the value web from DAMIAN.

During our workshop on content recommendations, we did not include the what-if scenario step. Based on the contributions of the participants, candidate scenarios could have been:

- What if a content provider thinks his content is not presented prominently enough in other organisations' recommendations and portals?
- What if a service provider wants to use other organisations' profiles on users' viewing behaviour?
- What if rules on EPG prominence would be extended to other types of guides and recommendations, as currently under discussion in the UK?

4. CONCLUSION

CONCLUSION

One of the key outcomes of convergence is that the traditional value chain has evolved into a value web, with multiple, parallel routes between service creation and consumption. However, it is crucial to recognize that the mere existence of many parallel routes has not removed the interdependencies between organisations and has even created new ones. Therefore, a systematic analysis of the interdependencies between organisations in the value web is called for.

In TNO's view, such an analysis should start from the so-called strategic assets that organisations have, such as content, a network, a large customer base or a strong brand. This asset-based approach is at the core of the DAMIAN method. DAMIAN has been successfully applied in workshops with many stakeholders, including operators, content providers, ministries, regulators, device makers and consumer interest groups, In the workshops, DAMIAN has been used to analyse interactive television services, video distribution in general, content recommendations for video services and neutrality deeper in the value web.

The feedback of the workshop participants bring out three important benefits of DAMIAN.

1. The structured process and the visualisation in the service delivery canvas provide a common shared background and knowledge base for the participants. This helps to keep people 'on the same page', resulting in a more productive and efficient discussion.
2. The initial scoping step in terms of end user (retail) services ensures that all relevant elements are taken on board in the discussion, thus avoiding the risk of a short-sighted focus on specific points receiving media attention.
3. The scoring of openness and alternatives for assets shows that workshop participants have different opinions. However, the discussion on the score helps to determine whether the differences are caused by fundamentally different views or merely by different interpretations of the same situation.

Based on their experience with the DAMIAN method and tool, a majority of the workshop participants expect that they will apply the method themselves or be involved in DAMIAN analyses of other cases. They have also provided a range of suggestions to extend the method and tool, for example with quantitative information on revenue streams and number of customers, more extensive filtering options and a multi-user on-line version of the tool for use in consultations.

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