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Background Review for Developing the Digital Competence Framework for Consumers

A snapshot of hot-button issues and recent literature

Fielder Anna, Vuorikari Riina, Rodríguez-Priego Nuria, Punie Yves

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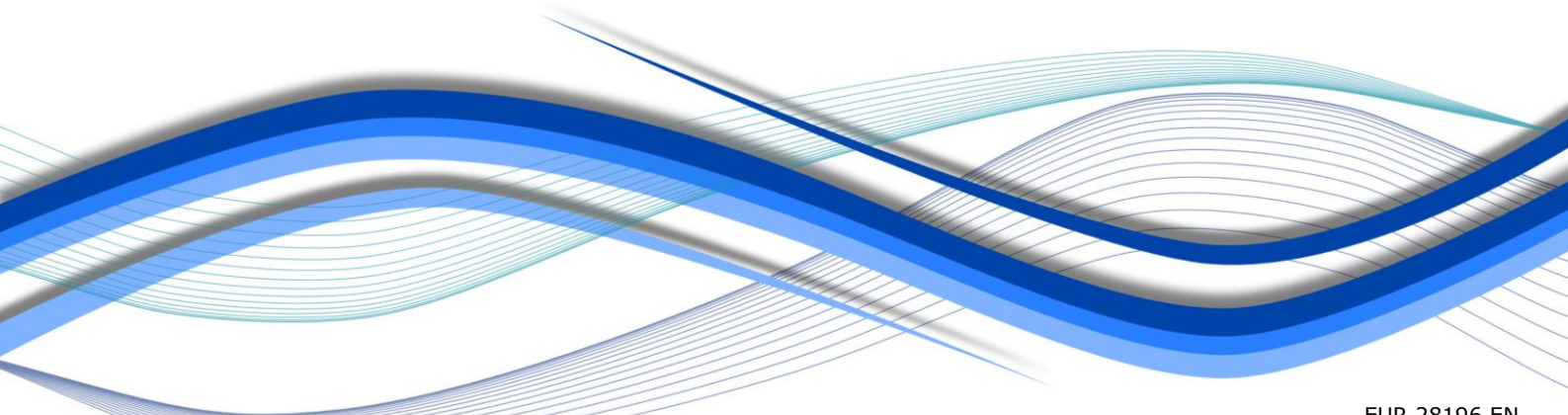

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Abstract

This report presents the results of a study of the requirements for developing a Digital Competence Framework in the context of a digital marketplace in the EU. Consumer digital competence is defined as the competence consumers need to function actively, safely and assertively in the digital marketplace. This framework will define the skills, knowledge and attitudes that consumers need to navigate the complex digital environment.

The research project to create the Digital Competence Framework for Consumers is a joint action of DG Justice and Consumers (JUST), and the Joint Research Centre (JRC), the Commission's science and knowledge service. The work, carried out between 2015-2016, aimed to achieve the goals set out by the European Commission in its two recent Communications: "A New Skills Agenda For Europe - Working together to strengthen human capital, employability and competitiveness" (European Commission, 2016) and "A Digital Single Market Strategy for Europe" (European Commission, 2015). Both these Communications focus on the importance of citizens' digital skills and their capacity to participate more deeply in our digital society and economy.

The study presented in this report is designed to elicit user requirements in order to support the development of the Digital Competence Framework for Consumers. The study was commissioned by the Joint Research Centre and it is a result of collaborative work between the authors of the report. Further consultation on requirements was carried out with DG JUST in which experts on various topics gave their input and contributed to the text. The literature and the hot-button issues described in this report reflect the state-of-play in 2015, when the study was carried out.

The methodology used to clarify the requirements for a consumer digital competence framework had four main steps. First, a 'broad-but-shallow' look into important emerging issues in the field of online shopping and advertisement was taken. In this phase of the study, a number of European Commission working documents on the issue were reviewed. The focus was also on current relevant literature, both academic and grey literature. Second, the existing terms and major work in consumer competence was reviewed and links were made to behavioural insights. It emerged that lack of digital competence can make consumers vulnerable in today's complex digital environment. Third, part of the work consisted of testing the suitability of the existing Digital Competence Framework for Citizens (DigComp) in an expert workshop to further prompt requirements for the new framework. Lastly, to finalise the process of requirement gathering, a gap analysis was conducted on a number of prominent sources of educational material for consumer competence.

The study found that the DigComp framework was a suitable starting point and confirms that it could be adapted to the new context of the digital marketplace. However, the analysis also showed that not all competencies are covered by the existing framework, in particular with regards to emerging digital trends and issues outlined.

The final product of the project, the Digital Competence Framework for Consumers, is described in a JRC Science for Policy publication by Brecko & Ferrari (2016). All information is available also at the JRC Science Hub[1].

[1] https://ec.europa.eu/jrc/en/digcompconsumers

1. Introduction

The purpose of this study is to set the context for developing the **Digital Competence Framework for Consumers (DigCompConsumers)** [2]**.** This framework would aim to provide a shared understanding at EU-level of the competences that citizens typically need in the digital marketplace.

DigCompConsumers is a joint action of DG Justice and Consumers and the Joint Research Centre (JRC). This initiative was first discussed at the "EU Consumer Summit: Ensuring that consumers reap the benefits of the digital economy" in April 2014 where a workshop was organised on the Digital Literacy needs of online consumers[3]. It found that consumer knowledge, skills and attitudes are out of step with the increasing sophistication of digital marketing practices, and that there is a lack of transparency in the gathering and use of consumer data.

As a result, it was recommended that a digital competence framework be developed specifically for consumers. This should define the competence consumers need to function actively, safely and assertively in the digital marketplace. It is envisaged that the final product, the Digital Competence Framework for Consumers, could be used in various ways: to clarify common goals and raise their visibility amongst the stakeholders; to inform all those with an interest in consumer education about expected learning outcomes; and eventually also to encourage discussion of how to deliver high quality information, guidance, education and training at both Member State and EU levels.

> The purpose of this report is to elicit requirements for developing the Digital Competence Framework for Consumers in the European Union that will define the skills, knowledge and attitudes that consumers need to function actively, safely and assertively in the digital marketplace.

We will study three aspects further. In Chapter 2, we highlight emerging issues, trends, and related potential detriments as part of the process of better understand the existing requirements for digital competence in this context. This review focuses on current trends that are mainly related to interactions between consumers and businesses, and particularly between e-commerce in goods and services. E-commerce goods include both tangible goods, such as toys or clothes; and intangible goods which are delivered digitally, such as software, e-books or music. Services can include everything from online banking to holiday bookings.

In Chapter 3, we look at the consumer competences and link them to some behavioural insights that have been gained from the recent research and literature. What emerges is that lack of digital competence can put any consumer in a situation of vulnerability. By digital competence we mean skills, knowledge and attitudes that range from the ability to make the right commercial choices and decisions, to knowledge of rights and contract literacy in a number of different sectors. Moreover, awareness of fraud and scams and how to prevent them is crucial, as is awareness of security and privacy issues related to new, disguised forms of marketing in social media and behavioural targeting through online tracking. Consumers should also be aware of their online rights and have the means to enforce them when things go wrong, and at least some knowledge of technologies on different platforms.

In Chapter 4, we review existing work on digital competence and its suitability for the complex digital environment that consumers need to navigate. The starting point for this work is the Digital Competences Framework for Citizens (DigComp[4]) that was first

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2 https://ec.europa.eu/jrc/en/digcompconsumers
3 http://ecs.onetec.eu/2014/workshops5_en.html
4 http://ec.europa.eu/jrc/digcomp

developed in 2013 by the JRC on behalf of DG Education and Culture, and further developed on behalf of DG Employment, Skills, Social affairs and Inclusion. In June 2016, Phase 1 of the update was published (Vuorikari et *al.*, 2016) and Phase 2 will be completed by early 2017 (Carretero et *al., forthcoming*). To support this phase of requirement gathering, a gap analysis is also presented in the Annex, which maps a number of existing digital educational materials on consumer education with the competences that are outlined in the DigComp framework.

Finally, in Chapter 5, a short conclusion presents the leads to the second Phase of the study, namely that of the development of a new framework. On the one hand, this analysis highlights the suitability of the DigComp framework as a starting point for the adaptation of the framework to the new context of the digital marketplace. On the other hand, it also reveals gaps where new competences need to be defined.

1.1 The overall methodology to build DigCompConsumers

DigCompConsumers study was jointly carried out by DG of Justice and Consumers, and the Joint Research Centre (JRC). The following activities were planned and carried out in the course of 2014-2016:

a) A compilation of emerging issues in the digital consumer context and of national best practices regarding digital competence in consumer education (this report). The study was commissioned by the JRC Seville, Human Capital and Employment Unit.

b) An initial proposal of what would constitute a suitable digital competence framework with examples of knowledge, skills and attitudes. The study was carried out by two experts and commissioned by DG JUST.

c) An expert workshop to discuss the initial proposals for a digital competences framework for consumers. The workshop took place in Brussels in December 2015.

d) An online validation exercise with a wider set of stakeholders took place in spring 2016.

e) In April 2016 in Seville, a second expert workshop was organised to validate the final version of the conceptual reference model for the Digital Competence for Consumer and to discuss the possible use cases of the framework at the European and Member State level.

f) Publication of the final DigCompConsumers framework (Brecko & Ferrari, 2016) and background report (this report) at the end of 2016.

2. Trends and Challenges for the Digital Consumer

The following chapter looks at different emerging trends and challenges that consumers face in the digital marketplace.

2.1 The internet as a tool to compare information on products and services

The internet has become the main consumer instrument for getting information about online and offline products and services, and about consumer rights and redress options.

An analysis of UK consumers in 2010 identified the emergence of a new kind of consumer awareness. Consumers were making greater efforts to obtain the best deal and many of them used the internet to tell others about their experiences[5]. In 2011, a study[6] on the state of the EU e-commerce retail goods market showed that around one in two European internet users had used the internet as a source of information before making a purchase.

But BEUC[7], The European Consumer Organisation, has underlined that '*Searching for the necessary information - if it's available - is not only complicated, but demands a great deal of time, which most consumers in their hectic daily lives cannot and do not want to spend*". Similarly, studies[8] have also shown that digital literacy plays a role –while experienced internet shoppers may spend more time searching across many sites, especially consumers with lower levels of digital literacy rely more heavily on brand names and spend less time searching. Focus group research and national studies[9] confirm that consumers are at the time of purchase mostly interested in information about product quality and price. They only become interested in information about their rights when they cannot sort out a problem with a trader directly, and resort to their social network or their virtual network to find leads for solving their problem.

Product and Price Comparison Websites (PCW) have also become popular tools for searching and assessing information online. A recent market study[10] examined in detail how various types of comparison tools function for consumers. The study found that three quarters (74 %) of EU online consumers have used price comparison websites and apps over the past year and four in ten (40 %) are using them at least once a month. At the same time, two thirds of comparison tool users (65 %) had experienced at least one problem when using such tools (e.g. unavailability of the product on the seller's website in 54 % of the cases or incorrect prices in 21 % of the cases). Less than half of the comparison tools tested disclosed details on their relationship with suppliers or described their business model (e.g. whether retailers had to pay to have their products listed). Only a third (34 %) provided information on how to file a complaint. As for consumers' own assessment of different types of comparison tools, although virtually all users agreed that price comparison tools allowed customers to compare prices, just 34 % said they could also be used to find unbiased product information. The study also shows that the way products are ranked by a comparison tool (e.g. position of the product in the ranking or the criteria used for ranking) influences the final choice of the consumer.

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5 Cullum, P. (2010). Unleashing the new consumer power, Consumer Focus.

6 Civic Consulting (2011). Consumer market study on the functioning of e-commerce and Internet marketing and selling techniques in the retail of goods. The study shows that 81 % of internet users used a price comparison website at least once in 2010, and 48 % of them used one once a month.

7 BEUC. (2012). EU Consumers' 2020 Vision. The European Consumer Organisation.

8 European Parliament (2012). Consumer behaviour in the digital environment. Section 5.3.

9 SWD(2012)235 final of 19.7.2012.

10 ECME Consortium. (2013). Study on the coverage, functioning and consumer use of comparison tools and third-party verification schemes for such tools.

The Civic research reveals, for example, that sites were unclear about their business models or policies regarding consumer protection and that more than half of those researched were not informative on delivery costs, time, taxes and product availability – all of which can mislead consumers into making the wrong choice[11].

Price Comparison Websites that compare financial products are of particular concern. The information they supply may be inadequate: for example, they may include limited numbers of providers or products in their comparisons, or their business sponsorship or links may lack transparency. According to the European Banking Authority "Comparison websites have gained increasing significance over the past few years, and are ever more often used as a means of communication and distribution that enhances the comparability of information for consumers. Significant drawbacks have also emerged with regard to over-reliance by consumers on the price of products, at the expense of a proper understanding of the underlying terms and conditions of the websites"[12]. As a result, the European Banking Authority is helping to produce a guide for consumers on how to use comparison websites for financial products, another piece of work to add to the overall information overload. The Payments Accounts Directive has also set parameters for these sites.

In order to remedy these problems, national regulators have, in certain sectors such as telecoms, energy and financial services, set up their own websites or initiated a price comparison site accreditation system. Nevertheless, as research in the UK from Citizens Advice[13] reveals, awareness of Price Comparison Website (PCW) accreditation is very low amongst consumers (in the research group), who generally consider that these sites are supplying a good service based on accurate and impartial data.

Lastly, the role of social media has become more important too. It has become a standard element in marketing strategies for products and services, and the dividing line between genuine consumer experiences and items posted to further commercial purposes is increasingly blurred. A report commissioned by the Belgian Privacy Commission analysed the evolving business models of social media operators[14]. For example, the Nordic Consumer Ombudsmen have signalled questionable social media marketing practices, such as spreading commercial messages to social media users by other private users who obtain discounts, prizes and other advantages for doing so. Similarly, user reviews have become an important tool to evaluate the quality of services, and the veracity of the information given by the service providers. However, the transparency of how rating systems work is not always guaranteed and user-generated reviews have been subject to criticism of including "advertising in disguise".

The multiplication of consumer information intermediaries may make it more complicated for consumers to distinguish between trustworthy and potentially biased sources of information. This means that reliability and trust are becoming the key issue for the future of web-based consumer information.

2.2 Cross-border e-commerce in the EU

The Commission's Consumer Markets Scoreboard from 2015 quantifies the untapped potential of EU cross-border e-commerce and reveals that this is still an under-developed market (only 15% of the population buy from another country[15]). These figures are echoed by survey statistics focused on Companies Engaged in Online Activities[16] which show that only 10% of online sales were cross-border EU sales. More-

[11] OECD (2011). *The Role of Internet Intermediaries in Advancing Public Policy Objectives*.
[12] EBA (2014). Consumer trends report 2014.
[13] Citizen Advice (2013). Price Comparison Website Accreditation Research Report.
[14] EMSOC and SPION. (2013). *From social media service to advertising network - A critical analysis of Facebook's Revised Policies and Terms.*
[15] http://ec.europa.eu/consumers/consumer_evidence/consumer_scoreboards/index_en.htm
[16] Flash Eurobarometer 413, 2015, http://ec.europa.eu/public_opinion/flash/fl_413_en.pdf

over, a majority of companies (58%) that sell goods online stated that they will not be likely to sell cross-border.

The issue has been a priority for successive Commission digital strategies[17] (e.g. for Digital Single Market Strategy), because it is believed that an online single market that works well would bring considerable benefits to consumers[18]. However, despite all the efforts by policy makers, while domestic e-commerce has grown steadily, cross-border transactions within the EU are lagging well behind. The *Consumer Markets Scoreboard* shows that while 61% feel confident about buying from their own countries, the figure for cross-border is only 38%. The research finds that lack of trust, territorial restrictions (known as geo-blocking) and price discrimination are still barriers to cross-border e-commerce.

Most importantly, the EU Consumer Scoreboard 2015 finds that consumers (and retailers) remain ignorant of some of the essential consumer rights guaranteed by EU consumer protection. A very low proportion (only 9%) were able to answer correctly when asked three questions about key contractual rights (guarantees, cooling off periods and unrequested goods) when shopping online. The lowest level of knowledge was found among young people. To address this problem, the European Commission carried out a Rights Awareness Campaign that started in 2014[19].

2.3 E-Banking and new online payment methods

Online banking nowadays not only includes managing one's finances through digital services, but banking functions have also increasingly become accessible via smartphones. A recent overview of new online payment methods reports figures from the European Banking Authority: a rise in digital transactions in Western Europe (from 6 to 10% in ten years), and a big increase in card-not-present fraud, i.e. fraud committed in situations where the merchant does not see the credit card. So trust in digital payment security is a major issue for consumers[20]. Eurostat data from 2014 reveal that 80% of people express concerns about using the internet for online banking or buying online, up from 75% in 2013. While three quarters of Europeans used the internet on a regular basis in 2014, only 44% engaged in e-banking.

More pertinent in terms of emerging trends is the appearance of new non-traditional digital payment methods, for example electronic money, such as using mobile phones as a payment device or electronic wallets. For example, Apple Pay which functions like a digital wallet for various debit or credit cards[21] is increasingly used and other mobile phone companies are following suit. There is already a history of using mobile phones for micro-payments: for example SMS-based transactional payments for bus tickets or car parking, where the cost is added directly to the phone bill.

Virtual currencies raise consumer protection concerns too: for example, Bitcoins are currently unregulated, but are evolving towards a new form of payment for goods and services. Concerns include possible loss of consumer funds maintained by Bitcoin exchanges, price volatility and the development of (unregulated) virtual currency-based investment products. Additional problems include lack of payment guarantees, and no

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17 See for e.g. under Commissioner Kuneva, http://europa.eu/rapid/press-release_SPEECH-09-91_en.htm

18 Civic Consulting. (2011). *Consumer market study on the functioning of e-commerce and Internet marketing and selling techniques in the retail of goods - Part I - Synthesis Report.* Report estimates the additional consumer welfare gains from a single EU consumer market in e-commerce in goods to be 59.4 billion Euro from lower online prices (0.5% of EU GDP) and 94.6 billion Euro from increased choice (0.8% of EU GDP) per year.

19 Consumer Rights Awareness Campaign 2014, http://bit.ly/1lOL8eZ and http://ec.europa.eu/justice/newsroom/consumer-marketing/events/140317_en.htm

20 European Parliament (2014). *New Trends and Key Challenges in the Area of Consumer Protection*. Page 12.

21 http://www.apple.com/apple-pay/

effective complaints or redress possibilities. Several EU countries and the European Central Bank have issued warnings on possible risks to consumers of this kind of currency.

2.4 Digital content products

Digital content products are electronic content products that consumers purchase online. These can be downloaded, stored, used or streamed online through the cloud services. The EU Directive on consumer rights defines digital content as "data which are produced and supplied in digital form, such as computer programmes, apps, games, music, videos or texts, irrespective of whether they are accessed through downloading or streaming, from a tangible medium or through any other means"[22].

There are many issues for consumers connected with these products that are listed comprehensively in an OECD review on the topic of digital content[23]. They include the following:

- problems with contracts (e.g. unfair terms and conditions in end-user licensing agreements or contracts that are overly complex and difficult to access);
- issues related to product characteristics such as transparency regarding copyright restrictions; and
- interoperability problems, such as playing purchased content on different devices;
- service interruptions or accessing purchased products in different jurisdictions;
- product quality (e.g. sound or image quality);
- misleading or unfair commercial practices (e.g. withdrawing purchased e-books on account closure);
- impacts on privacy (e.g. by collecting, reading or viewing habits and sharing them with third parties without the user knowledge or consent);
- dispute resolution and redress (e.g. when children buy services as part of online in games without an acknowledgement of parents).

Furthermore, cloud computing services contracts have also had problems with unfair terms. A 2014 study for the European Parliament points out that current national contract laws are not suitable for cloud-based services and there is a large imbalance in negotiating powers between providers and consumers, who consequently have to bear the risks[24].

The Consumer Rights Directive has remedied some, but not all of these problems. For example, there is now the right to a cooling off period for downloaded products, though consumers forego this right if they download the product straightaway[25]. Future measures will address a number of key issues: for example, by giving consumers redress if they receive defective digital content and by providing the means to terminate long-term contracts to facilitate switching.

In late 2015, the European Commission tabled a proposal for a directive on contracts for supply of digital content to consumers. The proposal would cover, with a single set of rules, contracts for the sale of digital content (e.g. when consumers buy music, films, e-books or applications) and for rental of digital content (e.g. when consumers watch a

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22 See: Directive on consumer rights, paragraph 19 of Preamble

23 OECD. (2013). *Protecting and Empowering Consumers in the Purchase of Digital Content Products.*

24 European Parliament, Think Tank. (2014). *The Cost of Non-Europe in the Single Market. Part III - Digital Single Market*. page 49

25 E.g. see the press release for the ten most important changes at: http://europa.eu/rapid/press-release_MEMO-11-450_en.htm?locale=en

movie online, but do not download a copy). These rules would also cover contracts for digital services, such as cloud computing and social media[26].

2.5 Consumers as sellers and micro-entrepreneurs

Another challenge for digital consumers is "C2C e-commerce" – i.e. consumers selling goods to other consumers in digital marketplaces and using online platforms. This has been enabled by the development and growing importance of online platforms which act as intermediaries for a fee and enable this kind of business to take place by managing the transactions between suppliers and buyers[27]. C2C transactions can take the form of auctions, classified advertisements, forums, and even individual pages for start-up entrepreneurs or 'free-cycle' communities which facilitate the donation of unwanted goods to others who need them.

There is evidence of widespread failures of basic consumer protection in C2C transactions, such as mis-described or counterfeit goods, scams, fraud, potential personal safety issues. There is also lack of redress when things go wrong, since consumers have fewer protection rights when buying from a private individual. A UK report by Citizens Advice[28] reveals that an estimated 10.7 million people in the UK have encountered a problem when buying goods through an online marketplace during 2014, and a substantial minority were not able to resolve their problem. A natural evolution from C2C e-commerce in goods has been the C2C e-commerce in services, otherwise known as the 'sharing economy', described below.

For C2C transactions, it is particularly important that consumers using digital marketplaces and platforms are aware of their differing rights, and also know how to take the necessary precautions to prevent problems, such as checking the identity of the seller, asking the right questions before buying, checking whether the goods are authentic and, importantly, learning the site's terms and conditions to know what their rights are.

2.6 The collaborative, sharing economy

As outlined by the OECD Digital Economy Outlook 2015[29], the business models of the sharing, on-demand or collaborative economy "enable collective consumption of private durable goods by providing access to excess capacity of these goods". These can range from home share to bike and car share, and include consumer to consumer transactions via platforms, such as Airbnb, Uber and Blablacar. Such services are facilitated by increasing internet penetration and ubiquity of smart phones, geo-location data, online user ratings and use of social networks.

While good for innovation, competition and even sustainability, direct consumer-to-consumer services are not covered by consumer protection legislation, and the responsibilities of intermediaries in these new business models have yet to be clarified. The OECD Digital Economy Outlook 2015 reports problems, for example, related to reliance of these models on ratings and reviews, which can have low response rates, incomplete information and misleading ratings.

Furthermore, services such as Uber have raised strong reactions from incumbent business associations, which regard these services as unfair competition, since it is not clear whether they should be subjected to the licensing regulations of a normal taxi service, or just considered as an intermediary. This has led to ad hoc regulatory intervention at various levels, and created legal uncertainty for users and providers. In

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[26] European Parliament. (2016). Contracts for the supply of digital content to consumers.

[27] Extensive work on the role of internet intermediaries has been carried out by the OECD, e.g. OECD. (2010) and OECD. (2011)

[28] Citizen Advice. (2015). *Peer Problems An assessment of the consumer experience of online marketplaces*.

[29] OECD. (2015)

May 2016, the European Commission proposed a new approach to online platforms, which addresses challenges in different areas (see more details and links through the press release[30]).

2.7 Use of mobile phones

According to the OECD Digital Economy Outlook 2015 report (OECD, 2015), smartphone adoption reached an average of 50% across the OECD countries. Consumers use smartphones increasingly for browsing the internet, accessing social networks, shopping and banking. Product information gathered on smartphones through the internet influences purchasing decisions online and offline, as mentioned in the section on "the internet as a tool to compare information". The above-mentioned report also points to the innovative business services enabled by the data generated by smart phones, including geo-location data.

From a consumer perspective, smartphones offer enhanced portability (e.g. anytime/anywhere access and location-based data) but reduced readability (e.g. smaller screens) or search results. These technical differences have economic implications. Enhanced portability could generate a substantial increase in consumer welfare from online services. It also gives consumer access to various digital services in circumstances with high opportunity cost of time (e.g. calling an Uber taxi based on location information) as well as the reverse, i.e. filling up time slots with low opportunity costs with a corresponding activity (e.g. watching a movie while waiting for a bus), thereby generating additional value. It also enables new online services that rely on location data.[31]

This rapid rise in consumer use of smart phones could have an impact on consumer activities and related protections across all the range of consumer activities in digital environments. The implications of this are manifold and range from the challenges of presenting information and contracts on small screens to privacy issues connected to geo-location and other protection issues connected with e-commerce. Also, increasing the use of smart phones as payment devices and electronic wallets change habits very rapidly and this also has ramifications for issues related to security. Lastly, there is the question of whether the use of mobile phones and other small devices would require different technical and digital competencies, including when they are used by children or older people with accessibility needs.

2.8 Collecting consumers' data on the internet

The "data landscape" on the internet is continuously evolving, with new and ever more sophisticated methods and techniques. Broadly, there are two opposite methods for data collection: one where the internet users give away their data and are aware of having done so (e.g. social media) and the other where the data is collected passively through automated means, for example through cookies and other tools that record visits and clicks, transmission of location data, etc. This type of data collection can be done in order to improve customers' user-experience on the website or service (e.g. offer personalised services or advertisements that the user is more likely to click on). However, more often than not, this data can end up being used in other ways that might compromise consumers' privacy and even discriminate against certain categories of consumers. For example, low income consumers might receive ads for very high interest 'pay-day' loans.

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[30] http://europa.eu/rapid/press-release_IP-16-1873_en.htm

[31] Quote from the background paper produced by the JRC for "Apps Economy Workshop: Innovation, privacy and consumer behaviour (JRC, Seville, 26 November 2015)

Both direct and passive data collection affect consumers, as they are not always aware of the information they are sharing and how it is used[32] (e.g. consumers may not be aware that their location data is being shared; number of "likes" in posts or pictures posted in SNSs[33] can help predict intimate personal attributes such as ethnicity, religious beliefs or sexual inclinations, etc.).

The current flood of data has resulted in an advertising 'eco-system' with hundreds of companies performing different tasks, dependent on data collection and mining – an online search for "advertising ecosystem" will reveal hundreds of schematics and large amounts of industry literature. This is also related to the use of big data, a term used to describe the application of analytical techniques to search, and the aggregation and cross-referencing of large data sets[34] such as location data, Twitter feeds, Google searches or various private data-bases. When put together, this data can produce a detailed picture of an individual's life. This has consequences for privacy and for behavioural advertising, but also for users of free of charge internet services. These three topics are outlined below.

2.9 Privacy

Privacy is the challenge and the hotly debated issue of the digital era. According to the OECD Digital Economy Outlook (OECD, 2015), governments have identified this issue as a top topic out of 31 possible priority areas of the digital economy. Privacy and related protection of personal data are also fundamental rights under the EU Charter of Fundamental Rights (Articles 7 and 8). Personal data has become an important commodity, a common currency of the information society, and a relevant subject for bilateral and multilateral trade agreements[35].

Numerous studies examine personal privacy choices and link them to consumer behaviour. They often point out the privacy paradox, i.e.: users' concerns about their privacy are not translated into a reduction of the quantity of data that they share online[36]. A JRC study shows that both level of education and age increase vulnerability when purchasing online. Both of them have an effect on unintended information disclosure online: older users give more personal information away without being aware of it. More educated users, on the other hand, avoid disclosing personal information online and at the same time, are more aware of information disclosure[37].

However, revelations of mass surveillance in recent years have prompted many users to change their behaviour and protect their privacy online[38]. Others think that disclosing personal information is an increasing part of modern life, or that they have no alternative[39], and then assume the risks. Much of this is due to incomplete and

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[32] Acquisti, A., Brandimarte, L., Leowenstein, G. (2015). Privacy and human behaviour in the age of information, SCIENCE.

[33] Kosinski, M., Stillwell, D., & Graepel, T. (2013). Private traits and attributes are predictable from digital records of human behavior.

[34] A simple overview of big data is available at https://www.privacyinternational.org/?q=node/8

[35] It is debated in the context of the Transatlantic Trade and Investment Partnership (TTIP) and the Trade in Services Agreement (TiSA); See for example the hearing on the subject organised by the European Parliament International Trade Committee (INTA) http://bit.ly/1NuqyUk

[36] One of the leading scholars in this field is Alessandro Acquisti, at the Carnegie Melon University in the US http://www.heinz.cmu.edu/~acquisti/; for a good summary of the privacy paradox, see OECD Digital Economy Outlook 2015, page 211.

[37] Monteleone, S., Bavel, R. van, Rodríguez-Priego, N., Esposito, G., & Institute for Prospective Technological Studies. (2015). Nudges to privacy behaviour: exploring alternative approaches to to privacy notices.

[38] Eurobarometer research (2014) – 88% of EU respondent claiming to have changed the way they use the Internet because of concerns about security of their personal data

[39] Lusoli, W., Bacigalupo, M., Lupiáñez-Villanueva, F., Andrade, N. N. G. de, Monteleone, S., & Maghiros, I. (2012). Pan-European survey of practices, attitudes and policy preferences as regards personal identity data management.

asymmetric information, as the collection and usage of personal data in digital environments is invisible and those collecting the data are not sufficiently transparent, while company privacy policies remain complex and unreadable[40]. This raises important questions about personal data and privacy.

Policy approaches that rely solely on user "empowerment" and information provision are not sufficient, and consumers need assistance and protection to help them navigate a "very uneven playing field". At the moment, the industry remains at the forefront and has competed to produce both privacy-enhancing (e.g. software applications that can be downloaded into browsers to reveal and block third-party cookies, such as advertising and tracking cookies[41]) and privacy-invasive technologies. While the latter are getting ever more sophisticated, the privacy-protective technologies are lagging behind because they require extra levels of knowledge and user effort which limits their efficiency, especially for some of the most vulnerable consumers. Government regulation and policy is also struggling to keep pace, as pointed out by the study on the Economics of Privacy[42].

2.10 Profiling and targeting in the age of endless data generation

General profiling and targeting

Behavioural targeting is based on profiling, a process in which assumptions are made about individuals based on automated processing of data which has been collected about them. Profiling is not a new practice, but it has become more developed and intrusive with the advent of endless data generation by users of various digital devices accessing public and private services and various digital environments. While detailed digital profiles are collected in the course of all activities in digital environments, and not just consumer transactions, the result and impact of the decisions of this profiling and targeting is generally felt in consumer-related activities, often in terms of behavioural targeting.

Studies point to potential negative impacts of profiling and behavioural targeting on consumers, such as:

- risks of being offered reduced choice or being victims of price discrimination through personalised pricing[43];
- exclusion of certain consumer groups from accessing certain products or services, because they are not profitable, or
- targeting them with certain products such as higher cost insurance or sub-prime/high-interest lending[44].

The theme of behavioural targeting was extensively discussed at the Digital Competences seminar of the Consumer Summit in 2014, thanks to a background paper from Frederick Borgesius that outlines most of the important issues associated with this marketing practice[45]. Given the complexity and hidden nature of profiling, it is unlikely that literacy alone can help consumers make decisions. Borgesius (2013), in his paper on behavioural targeting, concludes that "…many behavioural biases are likely to

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40 This was also one of the main messages from the Consumer Summit 2014, http://ecs.onetec.eu/2014/presentations.html

41 see for e.g. https://www.ghostery.com/en/

42 Acquisti, A., Taylor, C. R., & Wagman, L. (2016). The Economics of Privacy.

43 UK Office of Fair Trading. (2013). *Personalised Pricing, increasing transparency to improve trust in the Market*.

44 London Economics, Ipsos, VVA Consulting. (2013). Consumer vulnerability across key markets in the European Union. Page 27

45 Zuiderveen Borgesius, F. J. (2013). Consent to Behavioural Targeting in European Law - What are the Policy Implications of Insights from Behavioural Economics?

influence people's choices about behavioural targeting. […]. Perhaps education could help. People lack understanding of behavioural targeting and of online privacy risks in general. It's not suggested that people all become ethicists, lawyers and computer scientists. But some basic knowledge of privacy and security risks would be useful."[46]

Children profiling and targeting

Children are considered a particularly vulnerable category of online consumers due to their susceptibility to advertising and marketing directed at them. Young children do not fully understand the difference between advertising and other content (e.g. children's programmes infused with advertisements), while older children are susceptible to peer pressure and trends. However, to what extent children are vulnerable in this respect depends on context and circumstances – as children can have more digital skills than many adult consumers, although they lack the knowledge and attitudes needed.

One important point to note is that children's online consumer activities differ from those of adults, therefore the nature of profiling and targeting will be different. Children (from age 11) online are most likely to engage with social network sites, instant messaging, YouTube and gaming[47]. A European Commission-funded study is currently investigating the impact of marketing on children through social media, online games and mobile applications on children's behaviour (OGSMMA for short). The underlying practices of concern, identified by the European Commission, in marketing to children, include embedded advertising (advergames), in-app and online game 'virtual' purchases, personal data sharing, lack of transparency or age verification systems and age-inappropriate content[48].

On a more grassroots level, the panel and stakeholders discussing Advertising at the Safer Internet Forum 2014[49] suggest that children's online experience is too commercial. It also recognised that regulating online advertising is challenging, as ads increasingly emulate the appearance of ordinary content. This leaves children exposed to risks of tracking, threats to privacy and inappropriate content. There was a general conclusion that striking a balance between education and regulation (or self-regulation) was vital.

2.11 The use of free internet services – trade-off between privacy and daily convenience

In 2015, the most visited websites in the world include Google, Facebook, YouTube, Yahoo! and Baidu.com[50]. Google, for example, offers a set of tools for users to be used without any monetary payment. Even without signing up, the search-function is available. By signing up, the user gains access to communication tools such as e-mail, and collaboration and content creation tools that facilitate creating and sharing files such as documents, data and photos, but also video content through their YouTube service. Facebook, on the other hand, is a huge social networking service which is free of charge for users.

Even if monetary transactions for usage do not take place, the business models of these and similar services are often built upon the use of the data that users generate while using services. So even when users create content, send emails and interact with tools, the data ownership, according to a carefully drafted Privacy policy, in many cases belongs to the service provider. In other words, the use of these free-of-charge services can be seen as a trade-off: the users trade their personal data to use the tools at their convenience. However, the price tag includes a possible invasion of one's privacy due to

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46 Zuiderveen Borgesius, F. J. (2013), p. 48

47 *EU Kids Online: findings, methods, recommendations (deliverable D1.6)*. (2014).

48 Bennett, C. (2015). Impact of marketing through social media, online games and mobile applications on children's behaviour.

49 Focus on tolerance online (campaign website) http://bit.ly/1KcaAw0

50 http://www.insidermonkey.com/blog/5-most-visited-websites-in-the-world-in-2015-facebook-inc-fb-google-goog-and-more-343931/

the fact that so much personal data, transactions and interaction data, but also data about acquaintances and friends is used for business purposes such as advertising. The site *Security week*[51] asks: "At some point, we gave-up privacy for convenience, and now we think nothing of using Facebook, Gmail, and other free services. Most of us aren't aware we made the decision, but we most certainly did. A good question to ponder is: has this left us more vulnerable?"

2.12 Security, fraud and consumer trust

Online fraud and security are not new or emerging issues, but they continue to evolve with the development of technology and continue to be a major barrier to consumer trust and confidence in engaging in activities in digital marketplaces. There are new and ever more inventive fraudulent practices and some of them are so hidden and sophisticated that even experts find it difficult to detect, for example forms of spyware that load undetected (including by anti-virus precautions) onto individuals' computers and can read personal files or even manipulate webcams. Insecure behaviour online can also lead to actions where data breaches take place. Data breach can be defined as "the loss of information from computers or storage media that could potentially lead to identity theft, including social-security numbers, bank-account details, driving-licence numbers and medical information."[52]

The Eurobarometer survey dealing with cyber-security[53], finds that misuse of personal data and security of online payments are the two greatest concerns for consumers (mentioned by 43% and 42% respectively). As a result, many report that they have changed their behaviour online, by for example installing anti-virus software, being cautious with emails or managing their passwords more effectively. Interestingly, the survey finds that there is not much variation in concern levels between various consumer groups according to levels of literacy or age. However, frequent internet users and those engaging in online financial transactions tend to be more concerned without actually stopping their activities. Unlike levels of concern, there are differences in actual behaviour, as older users and those who have a lower level of education end up disclosing more information without being aware of it (Monteleone et al., 2015).

As a result of ever increasing numbers of business security breaches and revelations about mass surveillance, encryption is also being deployed more and more in consumer items. Many major internet companies, for example, are announcing enhanced security measures (e.g. Apple, Google, WhatsApp) (OECD, 2015). Security and privacy enhancing tools that can be used by consumers themselves are still scarce and difficult to use for the majority (e.g. the PGP encryption for documents and emails).

Is it also arguable whether digital competence in using these more sophisticated tools is the most effective means of achieving enhanced security. An alternative might be to simplify privacy choices for consumers and promote policies to ensure that security measures are embedded into every device that consumers use - like airbags in all passenger vehicles.

2.13 Internet of things

The Internet of things is the one issue in this review that is truly emerging. It broadly means that everyday objects are connected and able to be controlled and identified by other devices. This is being made possible on a large scale by the wide adoption of smartphones and other portable and wearable devices which act as control centers and hubs which link other devices and appliances to networks. Estimates of how many interconnected devices there are vary; one figure quoted is around 14 billion by 2022 in OECD countries (OECD, 2015, Sections 1.6 and 6). Examples quoted of connected

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51 http://www.securityweek.com/security-tradeoffs-culture-convenience
52 http://www.idtheftcenter.org/
53 Special Eurobarometer 423, 2014

appliances already in circulation include light bulbs that can be controlled over the internet, televisions, and music equipment that have internet connectivity; various domestic appliances (refrigerators, cookers) are already on the market, and even sporting goods such as tennis rackets.

All these developments could bring advantages for consumers and also potentially big disadvantages, particularly as regards their privacy security – data losses, infection by malware, intrusive use of wearable devices etc. Effectively IoT means creating and sharing immense quantities of data about consumer habits, behaviour and personal preferences[54]. More generally, consumer rights can also be affected. As the Digital Economy Outlook (OECD, 2015) concludes: "In order to ensure that the Internet of Things works to the benefit of people, some have argued that it should be thought of as the "Internet of Trust", as trust will be fundamental to enhancing user experience and addressing key legal challenges such as user privacy".

2.14 The take-home message from this review

This review aimed to identify new trends and ongoing important aspects of consumer-related activities in digital marketplaces, online platforms and other digital environments, in order to determine what would constitute a suitable digital literacy framework. This would build consumer trust in engaging in online activities, particularly when accessing goods and services throughout the EU, not just in their own countries.

Several important trends and ongoing issues have been identified, all of which would benefit at least to some extent from improved consumer digital competence. In an ideal world, the right competences combined with the right consumer protection policies and efficient enforcement would go a long way to solving existing potential problems.

One finding is that lack of digital competence can make any consumer vulnerable. Online consumer activities require a complex set of skills and competencies which need constant updating since this is a vast moving and developing environment with new technologies racing far ahead of any possible policy responses to them. These skills range from the ability to make the right commercial choices and decisions, to knowledge of rights and contract literacy in a number of different sectors, where and how to access redress when things go wrong, awareness of fraud and scams and how to prevent them, security and privacy issues and at least some knowledge of technologies on different platforms.

Summary of key conclusions, by issue:

- Personal data and other related information is now an important money-generating and trading commodity and technologies to collect, store, classify and profile consumers are getting increasingly sophisticated, while privacy-protective technologies are lagging behind as they require extra levels of knowledge and user effort. Individuals need to increase their competencies to protect their privacy; however, there is also a need for easier-to-master technologies.
- Profiling and targeting of consumers by advertisers and media companies is both complex and hidden by nature, so it is unlikely that literacy alone can help consumers make decisions, but at least some knowledge of how to use simple privacy-enhancing technologies and techniques would put consumers at a distinct advantage.
- With regards to e-commerce, while many barriers to online shopping remain outside consumers' control, the widespread lack of trust amongst consumers in engaging in online transactions, particularly cross-border, could be ameliorated by improved digital literacy, in particular understanding of online contracts, knowledge of rights and possibilities for redress.

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[54] Article 29 Data Protection Working Party, Opinion 8/2014 *on the Recent Developments on the Internet of Things*, 16 September 2014 http://bit.ly/1smejQi

- For consumer to consumer transactions (C2C), it is important to be aware of differing rights, as well as how to take the necessary precautions to prevent potential problems when using online platforms and marketplaces. This is equally important in the trending environment of shared services, such as transport or holiday accommodation.
- Use of mobile phones and other small devices might require different technical and digital competencies, including when in use by children or older people with accessibility needs. This is because they pose particular challenges such as reading lengthy contracts on small screens, or their increased use as payment devices and electronic wallets with related security concerns
- Improved digital competence is particularly important in the case of transactions with digital products, such as software or music, where benefits are directly related to knowledge of the online environment and consumer rights and responsibilities.

3. Consumers in the Digital World

The following chapter looks at the existing definitions of consumer competence and then introduces some insights from behavioural science to help us substantiate and define the context of our work for the Digital Competence Framework for Consumers.

3.1 Defining digital competence for consumers

Consumer competence in general has been defined as the *capability needed by consumers to function effectively and rationally in the marketplace* [55]. Consumer education has been the *defacto* strategic tool to empower consumers and to enhance consumer competence. It is "*… a process of gaining skills, knowledge and understanding needed by individuals in a consumer society such that they can make full use of consumer opportunities presented in today's complex marketplace. (Wells and Atherton, 1998)"*[56]. According to the same document, countries often use education as a means to empower consumers, citing the following objectives (OECD, 2009, p.11):

- Improve knowledge of the relations between consumers and other market players.
- Explain the proactive role that consumers can play in the marketplace and enhance consumer confidence.
- Provide guidance to help consumers to avoid falling victim to fraudulent or deceptive market practices.

Consumer education has traditionally focused on the transfer of skills in responsible (household) budget management and healthy eating habits. Over the past years, however, understanding advertising and marketing; knowledge about consumer rights and redress; education in sustainable lifestyles; and media literacy have become increasingly important[57]. A Nordic proposal for consumer competence structures the competences in six areas: sustainable consumption, marketing and commercial media, personal finance, consumer rights and responsibilities, household management, and media and technology literacy for age groups between 3 and 18 years of age[58].

The European Commission's Staff Working Document[59] also signalled links between digital literacy and consumer empowerment. Previous literature identifies three keywords to improve consumers' decisions in the digital market: knowledge, skills and attitudes[60].

Consumers' digital knowledge refers to the cognitive domain[61] and has to do with information search (online and offline) and pre-purchase evaluation[62]. This term would include knowledge of legal terms[63]. **Consumers' digital attitude** is related to

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55 Rhee, K., Yang, S., Cheon, K., Kim, S. & Kwon, H. (2007). Consumer competence index development. Research Paper submitted to Korea Fair Trade Commission.

56 OECD. (2009). Promoting Consumer Education: Trends, Policies and Good Practices. Page 9.

57 Nordic-Estonian Consumer Education Working Group. (2010). Teaching consumer competences– a strategy for consumer education. Proposals of objectives and content of consumer education (No. TemaNord 2010:568).

58 Nordic Council of Ministers. (2009). *Teaching consumer competences - a strategy for consumer education: proposals of objectives and content of consumer education*. Nordisk Ministerråd.

59 European Commission. (2009). On knowledge-enhancing aspects of consumer empowerment 2012 - 2014 (No. SWD(2012) 235 final).

60 Grønhøj, A. (2007). The consumer competence of young adults: a study of newly formed households. *Qualitative Market Research: An International Journal*, *10*(3), 243-264.

61 De Jong, T., & Ferguson-Hessler, M. G. (1996). Types and qualities of knowledge. *Educational psychologist*, *31*(2), 105-113.

62 Moschis, G. P., & Churchill Jr, G. A. (1978). Consumer socialization: A theoretical and empirical analysis. *Journal of Marketing Research*, 599-609.

63 Park, H. Y., Rha, J. Y., & Widdows, R. (2011). Toward a Digital Goods Consumer Competence Index: An Exploratory Study. *Family and Consumer Sciences Research Journal*, *40*(2), 184-199.

consumers' beliefs, feelings (affective domain) and behavioural intentions[64,65,66] toward digital consumer rights and responsibilities. **Consumers' skills** refer to their ability to apply and execute knowledge in compliance with the attitude[67]. Skills refer to traditional consumer skills in general terms, but also to digital goods, content and services purchase and usage skills. It includes searching, choosing, buying, using, and maintaining the product or service[68].

Additionally, digital literacy can enhance consumers' ability to profit from new digital goods and services, as is acknowledged by the OECD report[69]: "*Consumers' ability to fully profit from digital content products provided electronically depends, to a great extent, on their knowledge and awareness of the digital environment and of their rights and responsibilities. How such digital competence could be enhanced through education and awareness raising initiatives is a challenge for all stakeholders".*

Even if the previous literature has identified consumers' knowledge, skills and attitudes as the key to improving their decision making, it is important to keep in mind that consumers, however, can seldom be understood as one group, but can be distinguished according to income, education, age, etc. Recent work has focused on defining and identifying consumer vulnerability, either for structural reasons in specific markets, or as determined by personal characteristics[70]. Certain consumer groups, such as those with **lower education levels or scarce resources, and elderly or young people** have been found to be more vulnerable than others (Lyon et al., 2002; Brennan & Ritters, 2004; Monteleone et al., 2015). Moreover, groups among those considered *'vulnerable'* consumers are also those for whom basic *mathematical and literacy skills* are as important as learning about consumer rights[71].

3.2 The changing nature of consumer journey in the digital marketplace

Much of today's consumer policy is based on the assumption that consumers are rational decision makers, therefore they just need to be 'empowered' with the right tools and information to make the right decision. According to such assumption, the purchasing process of a rational consumer is simple and linear, consisting of searching and accessing information; assessing and analysing the information weighing up the costs and benefits; and acting upon this assessment by choosing the best alternative for them.

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64 Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, *50*(2), 179-211.

65 Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*.

66 Ouellette, J. A., & Wood, W. (1998). Habit and intention in everyday life: the multiple processes by which past behavior predicts future behaviour. *Psychological bulletin*, *124*(1), 54.

67 Park, H. Y., Rha, J. Y., & Widdows, R. (2011). Toward a Digital Goods Consumer Competence Index: An Exploratory Study. *Family and Consumer Sciences Research Journal*, *40*(2), 184-199.

68 Berg, L., & Teigen, M. (2009). Gendered consumer competences in households with one vs. two adults1. *International Journal of Consumer Studies*, *33*(1), 31-41.

69 OECD. (2013). *Protecting and Empowering Consumers in the Purchase of Digital Content Products* (OECD Digital Economy Papers). Paris: Organisation for Economic Co-operation and Development. Page 6.

70 European Parliament, 'Compilation of Briefing Papers on Consumer Vulnerability', for the Internal Market and Consumer Protection Committee (IMCO), 2012, PE 475.082

71 The Empowerment Survey shows that only 45% of European consumers were able to answer correctly questions on numerical skills, and 6% gave no correct answer. The latter share was greater than 10% in four Member States: Romania (21%), Italy (12%), Portugal (11%) and Bulgaria (10%).

If, post-purchase there is a problem, the rational consumer seeks redress and there may be other necessary post-sale interactions[72].

Businesses, on the other hand, have known for a long time that the consumer decision journey is much more complex, that it is multichannel and that it can be influenced by many factors along the way, as the figure below from McKinsey, the global business consultancy, illustrates[73]:

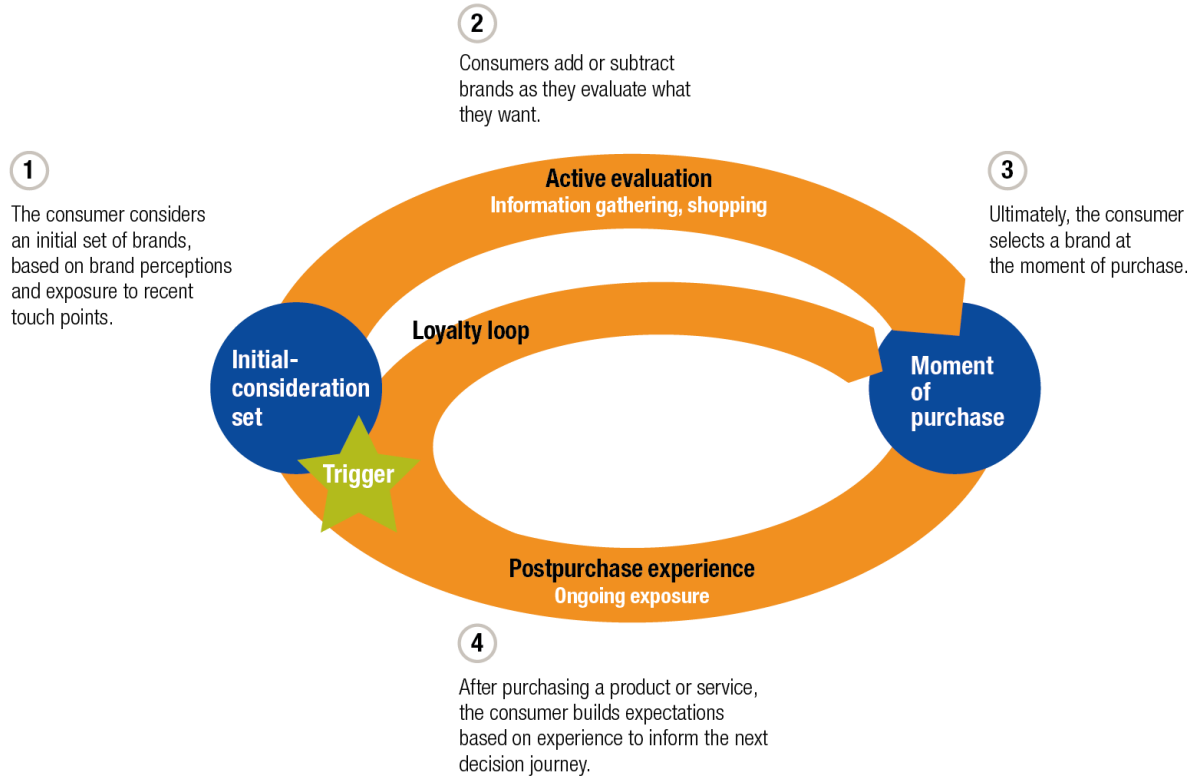

Figure 1: The decision-making process is now a circular journey with four phases: Initial consideration; active evaluation, or the process of researching potential purchases; closure, when consumers buy brands; and postpurchase, when consumers experience them. Source:
http://www.mckinsey.com/insights/marketing_sales/the_consumer_decision_journey

In the last years, there has been increasing understanding and research evidence that consumers do not generally behave in a rational manner. For example, the Staff Working Document (European Commission, 2012) pointed to studies, which warned that policy efforts in consumer information and education do not always have the desired effect in terms of applied consumer skills, because rational, informed decisions cannot be taken for granted, as is shown by behavioural studies. In the following, we make a short overview of insights gained from behavioural studies affecting consumers during their decision journey in the digital world.

3.3 Behavioural insights for online

Behavioural science aims, among other things, to gain new insights by examining how individuals' behaviour differs from traditional economic assumptions in various circumstances, taking into account the psychological, social, cognitive, emotional factors

[72] European Parliament, Policy Department: A Economic and Scientific Policy, IMCO, Consumer behaviour in the digital environment, PE 464.441

[73] Court, D., Elzinga, D., Mulder, S., Vetvik, O.J. (2009). *The consumer decision journey*. McKinsey Quarterly

that impact on individuals' economic decisions. The main idea that empowers behavioural science[74] is that instead of "changing minds" of individuals, one can "change contexts". This can be done through design of different ways in which choices are presented to consumers. These choices can be used to alter people's behaviour in a predictable way without enforcing or forbidding – this practice is called "nudging".

Behavioural science defines a number of biases that affect how people process information and make decisions. Particularly relevant for the purpose of this review is the study for the IMCO committee of the European Parliament[75], which specifically focused on consumers in the digital environment. The behavioural biases outlined include:

- Limited ability to process information (cognitive limitations);
- Tendency to choose default or existing options (default positions or status quo bias);
- Putting more value on small current payoffs, rather than larger, more distant ones (hyperbolic discounting);
- Being overly concerned with avoiding losses (loss aversion);
- Taking decisions that are sensitive to the way information is presented (framing of information).

These biases may have an impact on both the quality of the decisions that consumers make in the market, and their ability to make well-informed decisions. In addition, goods and services providers may try to exploit these behavioural biases to their advantage. In the digital environment, these biases and other behavioural insights are particularly relevant as described below:

Information overload. The quantity of information available to people when making an online purchase decision has increased, which can lead people to a state of *information overload*[76,77,78,79]. As a consequence, consumers apply simplified strategies that help them, as decision makers, cope with information overload, also called "rules-of-thumb". Some also question whether consumers are able to find and process all the information they need to make rational choices and maximize their benefit [80]. Consumer organisations call this 'information tyranny' or 'information pollution'[81].

Status quo bias. This is the tendency to like things to stay relatively the same. The online consumer sticks to the default option instead of making an active choice[82]. This bias will make consumers follow the pre-sets when they are in an e-commerce website for example. The same applies in the case of the privacy default settings in social

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74 Halpern, D., King, D., & Vlaev, I. (2010). *Going with the grain: influencing behaviour through public policy*. Institute for Government, Gabinet office.

75 European Parliament, Policy Department. (2011). An Economic and Scientific Policy, IMCO, Consumer behaviour in the digital environment, pg 38 et ff, PE 464.441

76 Jacoby, J., Speller, D. E., & Berning, C. K. (1974). Brand choice behavior as a function of information load: Replication and extension. *Journal of consumer research*, 33-42.

77 Scammon, D. L. (1977). " Information load" and consumers. *Journal of consumer research*, 148-155.

78 Lucian, R., Moura, F. T., Durão, A. F., & de Farias, S. A. (2007). Information Overload on E-commerce. In *Integration and Innovation Orient to E-Society Volume 1* (pp. 423-430). Springer US.

79 Lucian, R., & Farias, S. A. (2009). Effects of information overload on Brazilian e-consumers. *Am. J. of Economics and Business Administration*, *1*(1), 21-26

80 Stiglitz, J. E. (2002). Information and the Change in the Paradigm in Economics. *American Economic Review*, 460-501.

81 BEUC. (2012). *EU Consumers 2020 Vision.*

82 Samuelson, W., & Zeckhauser, R. (1988). Status quo bias in decision making. *Journal of Risk and Uncertainty*, 1(1), 7-59. doi: 10.1007/bf00055564

networks[83]. In this particular context, information overload leads individuals to ignore the information provided to them in Terms and Conditions and privacy notices[84, 85].

Anchoring. Here, the online consumer relies too heavily, or "anchors," on a past reference or on one trait or piece of information when making decisions (also called "insufficient adjustment").

Social and cultural influence. Individuals are affected by what others do and think in the same context. When going online, users realise the similarity of their values with their groups, and follow what others do, engaging in behaviours that are socially or culturally accepted, such as registering in a social network because your peer colleagues are doing it[86].

Reciprocity. We are consistent with our commitments. When people receive something, they are very likely to give back. In the online context, information-sharing behaviour in consumption communities is determined by the norm of reciprocity. It reflects embedded agreements and refers to two parties who mutually reinforce each other's actions[87].

Framing. The decisions that individuals make online are also influenced by the way information is presented to them. An example of this is "Valence framing", e.g. description of a choice in terms of losses or gains will affect behaviour. Subjects will rate a medical treatment as more effective when it is described as having a '50% success rate' rather than a '50% failure rate'[88]. Online reviews of products are also affected: users respond more favourably and give higher rates to reviews with a generally positive evaluation[89] [90]. Other types of framing include informal design of webpages which leads users to share more personal information[91].

3.4 The take-home message from this review

Existing work on consumer competence offers a solid base to extend the work to include the context of digital. Moreover, interesting new studies emerge in the area of behavioural biases revealing findings that are not favourable for the consumers, as could be summarised by the following quote: "Behavioural economics has demonstrated that, among other things, the manner in which information is presented and the way that choices are framed can significantly influence marketplace choices, sometimes in ways

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83 Acquisti, A., & Gross, R. (2006). Imagined Communities: Awareness, Information Sharing, and Privacy on the Facebook. In G. Danezis & P. Golle (Eds.), *Privacy Enhancing Technologies* (Vol. 4258, pp. 36-58): Springer Berlin Heidelberg.

84 Acquisti, A, & Grossklags, J. (2008). What can behavioral economics teach us about privacy? In Acquisti A, Gritzalis S, Lambrinoudakis C & di Vimercati S (Eds.), *Digital Privacy: Theory, Technologies, and Practices* (pp. 363-377). New York and London: Auerbach Publications.

85 Lucian, R., Moura, F., Durao, A., & Farias, S. (2007). Information Overload on E-commerce. In W. Wang, Y. Li, Z. Duan, L. Yan, H. Li & X. Yang (Eds.), *Integration and Innovation Orient to E-Society Volume 1* (Vol. 251, pp. 423-430): Springer US.

86 Cheung, C. M., Chiu, P. Y., & Lee, M. K. (2011). Online social networks: why do students use Facebook?. *Computers in Human Behavior*, *27*(4), 1337-1343.

87 Pai, P., & Tsai, H. T. (2015). Reciprocity Norms and Information-Sharing Behavior in Online Consumption Communities: An Empirical Investigation of Antecedents and Moderators. *Information & Management*.

88 Levin, I. P., Schneider, S. L., & Gaeth, G. J. (1998). All frames are not created equal: A typology and critical analysis of framing effects. *Organizational behavior and human decision processes*, *76*(2), 149-188.

89 Kamoen, N., Mos, M. B., & Dekker, W. F. (2015). A hotel that is not bad isn't good. The effects of valence framing and expectation in online reviews on text, reviewer and product appreciation. *Journal of Pragmatics*, *75*, 28-43.

90 John, L. K., Acquisti, A., & Loewenstein, G. (2009). The best of strangers: Context dependent willingness to divulge personal information.

91 John, L. K., Acquisti, A., & Loewenstein, G. (2009). The best of strangers: Context dependent willingness to divulge personal information.

that are not in the best interests of a consumer." (OECD 2010, p. 10). The design of the Digital Competence Framework for Consumers should pay attention to this issue in order to help consumers recognise and address potential **behavioural biases** (e.g. inertia, procrastination, overconfidence and sensitivity to framing) throughout their "consumer journey in the digital world".

4. Testing the suitability of the Digital Competence Framework for Citizens in the context of the digital marketplace

In the following, we first explain the basics of the Digital Competence Framework for Citizens and then discuss its potential for the context of the digital marketplace.

4.1 Introduction to Digital Competence Framework for Citizens

Digital competence involves the confident and critical use of ICT for employment, learning, self-development and participation in society. It is one of the Key competences for lifelong learning (European Commission, 2006). Digital competence is described as the set of knowledge, skills, attitudes and awareness that are required when using ICT. Therefore, digital competence is more than just a set of ICT functional skills.

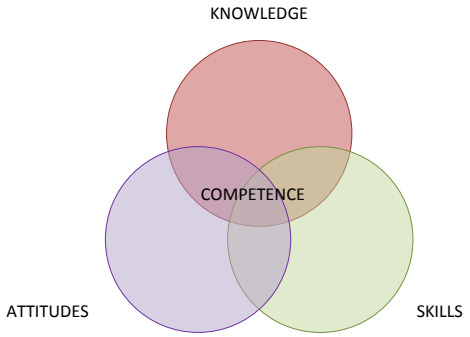


Figure 2. A competence is described as a set of knowledge, skills and attitudes.

The starting point for this work is the Digital Competences Framework for Citizens (DigComp[92]). It defines the competence as the sum of knowledge, skills and attitudes (see image above). The DigComp framework was first developed in 2013 by the JRC on behalf of DG Education and Culture, and further developed on behalf of DG Employment, Skills, Social affairs and Inclusion. In June 2016, Phase 1 of the update is published (Vuorikari et *al.*, 2016) with Phase 2 being completed by the end of the year (Carretero et *al.*, *forthcoming*).

In the DigComp framework, each competence is presented in the same format including the title and a short definition of the competence, also known as a descriptor. Table 1 shows an example of one of the competences, called "Evaluating data, information and digital content".

Dimension 2 *Competence title and description*	**Evaluating data, information and digital content** To analyse, compare and critically evaluate the credibility and reliability of sources of data, information and digital content. To analyse, interpret and critically evaluate the data, information and digital content.

Table 1. An example of the title and the descriptor.

The DigComp framework is comprised of 21 competences that describe what digital competence is. The framework groups the competences in five areas: Information and Data literacy; Communication and Collaboration; Digital content creation; Safety; and Problem solving. They are listed in Table 2.

92 http://ec.europa.eu/jrc/digcomp

Competence areas	Competences
1. Information and data literacy	**1.1 Browsing, searching and filtering data, information and digital content** **1.2 Evaluating data, information and digital content** **1.3 Managing data, information and digital content**
2. Communication and collaboration	**2.1 Interacting through digital technologies** **2.2 Sharing through digital technologies** **2.3 Engaging in citizenship through digital technologies** **2.4 Collaborating through digital technologies** **2.5 Netiquette** **2.6 Managing digital identity**
3. Digital content creation	**3.1 Developing digital content** **3.2 Integrating and re-elaborating digital content** **3.3 Copyright and licences** **3.4 Programming**
4. Safety	**4.1 Protecting devices** **4.2 Protecting personal data and privacy** **4.3 Protecting health and well-being** **4.4 Protecting the environment**
5. Problem solving	**5.1 Solving technical problems** **5.2 Identifying needs and technological responses** **5.3 Creatively using digital technologies** **5.4 Identifying digital competence gaps**

Table 2. The conceptual reference model of DigComp 2.0

Additionally, each competence is illustrated with examples of knowledge, skills and attitudes, as examplified in Table 3.

Knowledge examples	Evaluates media content Judges the validity of content found on the internet or the media, evaluates and interprets information Understands the reliability of different sources Understands online and offline information sources
Skills examples	Is able to deal with information pushed at the user Assesses the usefulness, timeliness, accuracy and integrity of the information Can compare, contrast, and integrate information from different sources Distinguishes reliable information from unreliable sources
Attitude examples	Recognises that not all information can be found on the Internet Is critical about information found Is aware that search engine mechanism and algorithms are not necessarily neutral in displaying the information

Table 3. Examples in the array of knowledge, skills and attitudes

4.2 Testing the suitability of DigComp for the context of consumers in the digital marketplace

During EU Consumer Summit in April 2014, the DigComp framework was presented to the experts participating in the Digital Literacy session. After that, a group exercise was set up in which the participants were asked to evaluate the suitability of the DigComp framework for online consumers. A worksheet had been prepared for this purpose where the participants were asked to evaluate the importance of each competence for consumers in the digital marketplace.

The results are given in Table 4. It shows, for example, that the competence called "Protecting personal data" was voted unanimously as "important" for consumers. Moreover, more than 2/3 considered that the following competences were also valuable: "Evaluating information"; "Protecting devices"; "Browsing, searching and filtering information"; "Managing digital identity"; "Interacting through technologies"; "Sharing information and content"; "Protecting health"; "Protecting the environment"; " Storing and retrieving information" and "Copyright and licences".

Competences voted as important for consumers	Count of votes
4.2 Protecting personal data	26
1.2 Evaluating information	24
4.1 Protecting devices	24
1.1 Browsing, searching and filtering information	23
2.6 Managing digital identity	22
2.1 Interacting through technologies	20
2.2 Sharing information and content	20
4.3 Protecting health	19
4.4 Protecting the environment	18
1.3 Storing and retrieving information	17
3.3 Copyright and licences	17

Table 4. Votes from the participants in the Digital Literacy workshop (n=26)

Additionally, to support this phase of requirements gathering, a number of existing digital educational materials on consumer education were mapped with the competences that are outlined in the DigComp framework (see Annex 1 and 2).

4.3 The take-home message from this review

Based on the results gathered from the expert workshop and the inventory of digital educational material, it becomes clear that the DigComp framework offers a good starting point for developing a derivative framework for consumer competence in the digital context. On the other hand, not all 21 DigComp competences are necessarily needed for this context. It also reveals gaps where new competences need to be defined.

5. Conclusion

In order to find out what the essential requirements for a consumer digital competence framework are, the research took four main steps. First, we took a broad-but-shallow look at important emerging issues in the field of online shopping and advertising. In this step, we reviewed some of the research literature and European Commission working documents on the issues. Second, we reviewed some of the existing concepts in the area of consumer competence and also looked at the behavioural biases that consumers are confronted with in the digital marketplace. What emerges is that, among other things, lack of digital competence can make consumers vulnerable. Third, the suitability of the existing DigComp framework for the complex online environment that consumers navigate was tested in an expert workshop to elicit further requirements for the new framework. Lastly, to finalise the process of requirements gathering, a gap analysis was conducted on a number of prominent educational materials for consumer competence.

Our analysis highlights the fact that existing descriptions of general consumer competences (e.g. Nordic Council of Ministers, 2009; NECE, 2010; OECD, 2010) and general digital competence, as developed in the DigComp framework, are not sufficient to guide policy makers and other involved stakeholders to identify the competences citizens need in the fast evolving digital marketplace. Moreover, all the phases of the decision-making process should be covered (e.g. pre-purchase, purchase and post-purchase). At the same time, the changing landscape of consumers' online activities and the more complex and multi-channelled factors in play should be taken into account. Therefore, a focussed set of competences is needed that help consumers to engage in the digital marketplace and function actively, safely and assertively.

The analysis highlights the suitability of the DigComp framework as a starting point and confirms that it could be adapted to the new context of the digital marketplace. However, the analysis also raises issues that should be resolved, i.e. whether relevant competencies are not covered by the existing framework, in particular with regards to emerging digital trends and issues outlined. The following conclusions were drawn:

- The majority of the current competences outlined in the DigComp framework fit the consumer context well, although some of them need redefining and fine-tuning. For example:
    - "2.3 Engaging in online citizenship"[93] includes e-commerce and e-banking in the same competence descriptor. These two services are classic examples of consumer market activities which involve both contractual and rights issues. Therefore, to put better emphasis on them, they would need to be listed under two separate competences.
    - "3.3 Copyright and licenses" is included under 'Content Creation', but there is also a strong consumer dimension to this issue, which is connected to file-sharing, responsibilities and rights, and dealing with Internet Service Providers or threatening lawyers' letters.
    - In the safety section, "4.2 Protecting Personal Data and Privacy" also includes dealing with scams, fraud and cyberbullying. These issues need to be dealt with separately as the consumer rights and legislation that cover them are different. Dealing with scams and fraud is one of the issues covered most widely by consumer digital literacy materials. Data protection and privacy are also fundamental rights within EU treaties, so they go beyond safety.
- Surprisingly, there are relatively few materials on contract literacy, rights/responsibilities and redress in the digital environment. These issues are mostly described by consumer groups and relevant authorities in terms of the Distance

[93] See Table 2

Selling Directive, but they are not necessarily integrated into materials as part of digital literacy.

- Annex 2 lists consumer-related issues covered by the materials examined. Notable gaps that were identified, where no coverage has been found so far, include the following issues:
    - the sharing economy;
    - consumers as sellers and micro-entrepreneurs;
    - privacy as a commodity;
    - new online payment methods;
    - profiling and targeting advertisement.
- Issues around potentially vulnerable consumers (e.g. older consumers, discrimination, access) are also barely covered.

Finally, in brief interviews with some of the consumer groups, education materials for the following digital topics were most often described as needed. These should therefore also be considered for the list of competences:

- Copyright: what are consumers allowed to do? What is legal? What is illegal? What is not regulated? Regulation is often unclear, and legal experts come to different conclusions. This can cause problems that consumers have to deal with.
- Data protection: more information and suggestions are needed, in particular with new legislation coming online.
- Telecommunications: contract literacy, in particular.

Annex 1: Inventory of existing educational resources on consumer digital competence

The aim of this part of the review was to map out existing materials for consumer digital competencies, in order to understand what type of consumer issues and competencies such material focuses on and where the potential gaps are. The task required a focus on a small number of countries and pertinent examples, using the existing DigComp framework.

As the task requires an inventory specifically of consumer digital literacy material, it is important to define what is meant by consumer, rather than general/citizen digital competencies, since often there is a thin line between the two. For the purpose of this exercise the consumer digital competence is understood to refer principally to the competences consumers need to function effectively in online marketplaces of goods and services, including competencies related to consumer rights (right to safety, to choice, to be informed, to be heard, to redress, but also satisfaction of basic needs and a healthy environment) as applicable in the online environment.

Two further issues are important to note:

- Although consumer education and consumer information/advice or social marketing materials are all different disciplines and differently defined, they were equally considered, since the aim of this exercise is to map consumer digital competence coverage rather than the methodologies and processes by which they are transmitted. They are listed under different columns in the table.
- The inventory considered the availability of a material for a particular subject or theme and whether it is related to consumer digital literacy; the quality of the material itself is not assessed.
- Given the limited time and resources available to survey and identify relevant materials, a number of practical short-cuts were used:
    - An appeal for information was made on consumer organisations networks, those of BEUC and the Transatlantic Consumer Dialogue (80 member organisations in the EU and the US). The main response to this appeal came from consumer organisations in Germany (VZBV – Federation of Consumer Organisation) and UK (Citizens Advice). This is not really surprising, as these are well-resourced national organisations with a mission to advise and resolve consumer complaints. Therefore these two organisations were used as main 'case histories' for the mapping exercise.
    - In addition to the appeal described above, a brief survey of main consumer organisations websites was carried out to identify any possible materials, using online translation tools. Other consumer organisations do produce consumer digital competence resources on a smaller scale, but it was found that the two organisations' selected above captured all issues covered by others.
    - As an important source for consumer education materials in particular, the web gateway of the EU-funded project of Consumer Classroom was used to identify available materials and coverage on consumer digital competencies.
    - In addition, a U.S case history was used from a consumer organisation that is particularly strong on catering to ethnic minority, immigrant and disadvantaged groups, and on financial digital issues.

The main case history countries and organisations whose information was used for mapping out consumer digital competencies are summarised below, while Annex 2 maps out the competences covered in more detail.

1. Citizens' Advice, UK

"The Citizens Advice service is the Government-funded provider of consumer education in Great Britain, bringing consumer advice, advocacy and education under one roof"

https://www.citizensadvice.org.uk/consumer/

The digital competencies materials are part of a broad selection of consumer rights topics.

Information and advice

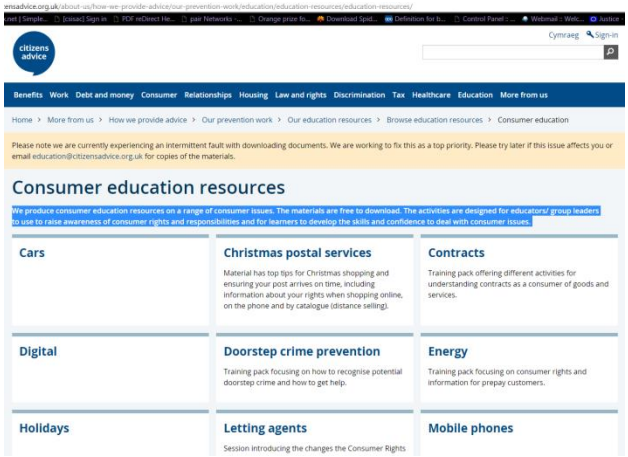
Citizens' Advice (CA) is developing a new approach to digital advice, based on feedback from people seeking the advice as well as the advisers around the country. It is based on the principle "we help people to solve a problem" – and the content of the advice online needs to have two elements that people need: problem resolution, and clear information about rights and entitlements (http://bit.ly/1Q9dJjS). The information and resources provided are issue and sector based.

In terms of consumer online media information and advice, CA provides a number of materials which are on the increase as the pages are still being developed, so for example the sections on 'Digital' and 'Mobile' are still not populated with documents.

Current materials include advice and information on copyright and file-sharing on the internet, internet fraud and scams and problems and rights regarding digital products, software and downloads, as well as advice regarding telecoms service providers. These pages follow the principle of actionable information described above; for fraud and scams there are also combined resources, both educational and for campaigning and awareness raising. (http://bit.ly/21HFwMq)

Digital Educational Resources

Citizens Advice produces education resources on a range of consumer issues, including digital: "The activities are designed for educators/group leaders to use to raise awareness of consumer rights and responsibilities and for learners to develop the skills and confidence to deal with consumer issues".



At the time of this research, materials available on the site included a comprehensive set on scams and fraud and contracts generally, with a digital and mobile phone section still under development.

Digital competences currently covered : 1.2; 3.3; 3.3; 6.2; 6.4; 6.6.; 6.7

2. German Consumer Federation (VZBV)

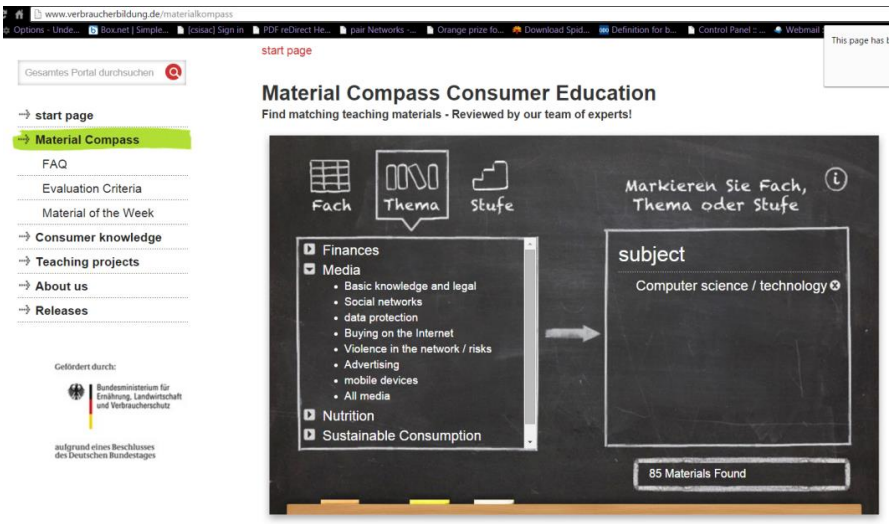
Information and advice

Dedicated site and project: Surfers have rights

https://www.surfer-haben-rechte.de/rechtliches

The German Consumer Federation's (VZBV) online project 'Surfers Have Rights' is the most comprehensive information and advice resource on consumer digital issues found in Europe. It covers every aspect of the consumer online experience, including search engines, webmail services, online shopping, social communications, etc. The site is organized by themes (including specific issues, stakeholder groups and sectors), such as cookies, auctions, data security, or children and adolescents; terms (legal issues relating to consumer protection on the internet); and service (resources for solving problems), such as sample letters, checklists and past judgments on for e.g. data protection cases. It covers risks and hazards, obligations of providers and the rights of users. Each of the issues and themes is explained in accessible brief illustrated sections, easy to understand and read for a consumer seeking the information (even when passed through an online translation tool!). The design is user-friendly and themes are readily accessible. The project is government funded.

Digital Educational Resources

A separate online project of VZBV is called Kompass, which is a gateway for comprehensive consumer education teaching materials from all consumer-relevant areas including media literacy, which is listed as a theme under the subject of computer science and technology.	

It is the most comprehensive resource found in one language, with a single portal (includes Germany and Austria), and one of the very few where education materials on sustainability and ITCs and even government surveillance (Prism, NSA) were found. The emphasis is on the teaching of "every day and consumer skills". The materials, which come from different providers, are described, evaluated according to a number of stated criteria, given a star rating (between 1 and 5 stars) and the link to the original is given. The assessment is focused on how well the resources are suited to consumer education.

The media literacy section includes resources on every digital consumer aspect, including basic knowledge and legal issues, mobile devices, social networks, security, data protection, e-commerce, cyber-bullying and advertising. The site is logically organised and easy to search, and is equally usable for a non-German language speaker with the help of an online translation tool.

Digital competencies covered: 1.1, 1.2, 2.1, 2.2, 2.4, 2.4, 3.3, 4.1, 4.2, 6 (all consumer related issues). (All except 3 and 5)

3. Consumer Action, US

http://www.consumer-action.org/

An example from the United States is also included in this review, with the aim of enriching the list of possible competencies and consumer digital issues to be considered in a literacy framework. Consumer Action is a national consumer group that specializes in education and handling complaints, in the areas of credit, banking, privacy, insurance and utilities and has a mission to serve under-represented consumers (e.g. ethnic minorities and immigrants) so publishes its materials in several ethnic community languages. It provides and distributes to community groups both information and education materials (lesson plans and training slides and modules) on subjects and issues such as 'digital dollars' (online banking), privacy controls for social media users, health records privacy, workplace privacy, internet security and id theft, fraud and scams, etc. Some of the materials are consumer segment-specific, covering, for example, children's privacy or prevention of scams/fraud on older people. A separate Empower U module deals with all aspects of telecommunication services.

http://www.consumer-action.org/publications/

http://www.consumer-action.org/outreach/list/C287/

http://www.consumer-action.org/modules/module_empower_u

Digital Competencies covered: 2.2, 2.3, 2.6, 4.1, 4.2, 6.2, 6.3, 6.5

4. Consumer Classroom, EU

The Consumer Classroom is an EU Commission-funded web-based project which aims to promote consumer education and encourage its teaching in European secondary schools. It is aimed at teachers and other interested professionals. It defines consumer education as "… concerned with teaching people the skills, attitudes and knowledge required for living in a consumer society. It is a fundamental component of general education, which should support consumers in their attempts to organise their everyday lives in a sustainable way." (http://bit.ly/1SHvdBQ).

The website collects and includes teaching resources on this very widely definition area of consumer education from all over Europe in all languages under several searchable themes and subjects. The themes listed that are most relevant to digital consumer competencies are media literacy, information and communication, social media and the internet, while ICT is also included as a subject. The search tool allows combination of these themes and subjects with others such as consumer rights and financial literacy, and in this way one can list anything between 30 and over 100 relevant resources. Every resource has a summary which can be translated with the online translation tool[94].

Other resources than consumer education related material is also made available – some are more related to citizenship and media issues generally, while others are more in the nature of information and advice leaflets. In terms of digital competencies materials by far the richest storage refers to internet safety issues; buying on the internet/e-commerce, children safety online and social networks are also reasonably represented. Other issues, such as copyright or information and evaluation tools, or aspects of data protection or profiling and targeted advertising are less well represented.

Resources are rated from one to five stars; the rating is based on users' assessments, and on input from experts.

[94] It should be noted that the search function and the quality and availability of summaries are in need of improvements that are planned for 2016.

http://www.consumerclassroom.eu/online-teaching-resources

Digital competencies covered (in various languages and formats): 1.1, 1.2, 2.3, 2.5, 4.1, 4.2, 6.1, 6.2, 6.4, 6,6, 6.7, 6.8

Annex 2: Table Consumer Digital Competencies Framework

Competence Areas	Competences	1.a Citizen Advice UK - information	2.a Citizen Advice UK - education [4]	2.a VZBV - De - information	2.b VZBV - De - education [5]	1.c Consumer Action, US	1.d Consumer Classroom [3]
1. Information	1.1 Browsing, searching and filtering information			YES (issue specific, e.g. review sites, price comparison sites)	YES (in a variety of formats, e.g. as introduction for primary schools, Internet ABC, 'How do I find what I'm looking for', etc)		YES (INC France)
	1.2 Evaluating Information			YES (issue specific, e.g. dating sites)	YES (in a variety of formats, e.g. Mobile phone and the internet, 'Google and Wikipedians - search, find and evaluate', 'All true judge Websites')		YES (Latvia 'a critical approach to internet content'; EU with focus on young people, Slovakia, Greece, Bulgaria, Polish, etc.)
	1.3 Storing and retrieving information						
	2.1 Interacting through technologies			YES (issue specific, several)	YES (e.g. using messaging services, chats, Web 2.0)		YES (e.g. using online chats, skype for the competitions, etc.)
	2.2 Sharing information and content			YES (issue specific, e.g. filesharing)			YES (e.g. using My Class tool, Lesson builders tools or by uploading content on the website)
2. Communications	2.3 Engaging in online citizenship [1]		YES (extensive 'money online' resource packs)	YES (e.g online shopping)	YES (several, e.g. personal financial management, shopping on the Internet)	YES (extenisve e-banking, 'digital dollar)	YES (particularly online shopping e.g. Lithuania; Finland; Denmark; Estonia, Poland, UK, France (INC), etc)
	2.4 Collaborating through digital channels			YES (e.g social networks	YES (many materials, e.g. FB, social networks 'Surely Communicate in Social Networks' for secondary schools, 'Social Communities - knowhow for young users')	YES (social networks)	YES (social networks; many countries)
	2.5 Netiquette				YES (e.g. what to do about cyberbullying?)		YES (e.g. cyberbullying: UK, Bulgaria, Denmark, Sweden, France, several others)
	2.6 Managing digital identity			YES (e.g. digital estate)	YES (e.g. 'Behaviour and self-expression on the Internet'	YES (banking related)	YES (e.g. France 'Course digital identity'

Competence Areas	Competences	1.a Citizen Advice UK - information	2.a Citizen Advice UK - education [4]	2.a VZBV - De - information	2.b VZBV - De - education [5]	1.c Consumer Action, US	1.d Consumer Classroom [3]
	3.1 Developing Content						YES (with Lesson Builders tools and /or with resources explaining to teachers how to create databases with access, Data Flow Diagrams, or how to create and share multimedia educational activities for any device using the HTML5 technology)
3. Content Creation	**3.2 Integrating and re-elaborating**						YES (with Lesson Builders tools and /or with resources explaining to teachers how to create databases with access, Data Flow Diagrams, or how to create and share multimedia educational activities for any device using the HTML5 technology)
	3.3 Copyright and licenses [2]			YES (see new section 6)	YES (see section 6)		YES (lessons explaining copyright issues e.g. Poland)
	3.4 Programming						
	4.1 Protecting Devices	YES (security, scam prevention)	YES (security/scams)	YES (security)	YES (several, e.g. the Transparent Man, 'KnowHow for Young Users')	YES (security/scams)	YES (several e.g. Slovakia; Austria; Estonia; Finland; Italy; UK; France/INC, Poland, Romania, many others)
4. Safety	4.2 Protecting Personal Data			YES (privacy, data protection)	YES (several, e.g. the Transparent Man, 'I am publicly completely private' by Klicksafe.de, etc))	\	YES (e.g. Sweden; Austria; Italy; Denmark; France/INC; Poland; Romania; several others particularly in relation with social networks and financial/id theft)
	4.3 Protecting health						YES (resources promoting the safe and healthy use of new technologies e.g. Spanish)
	4.4 Protecting the environment				YES (several, e.g. course on consequences of globalisation in the IT industry using mobile phones as e.g.; Standby - power consumption; 'Green IT)		YES (resources on sustainable consumption and particularly on circular economy linked to IT apps or devices)
	5.1 Solving Technical Problems						
5. Problem solving	**5.2 Identifying needs and technological responses**						
	5.3 Innovating and creatively using						YES (Inter-School competitions each year on the website encouraging teachers and pupils to prepare projects on a given thematic using innovative IT technology to present their projects (e.g. Prezi, website

Competence Areas	Competences	1.a Citizen Advice UK - information	2.a Citizen Advice UK - education [4]	2.a VZBV - De - information	2.b VZBV - De - education [5]	1.c Consumer Action, US	1.d Consumer Classroom [3]
	6.1 Dealing with online marketing (behavioural targeting and social influence through media)			YES (cookies, online advertising)	YES (e.g. 'Digital Footprint' (LMZ)		YES (e.g. Portugal (focus on the young); Slovakia (Modern Marketing)
6. Consumer related issues	**6.2 Knowing online rights and understading online contracts**	YES (Consumer section)	YES (part of ed materials on contracts generally)	YES (covers contracts, copyright, data protection, warranties, etc)	YES (several examples some in combination with other themes, e.g.'Online Shopping with No Regrets, Internet ABC for primary schools, 'Consumerism Compact - shopping on the Web, 'Caution Contracts' (Ministry of CP) for schools, etc)		Yes (e.g. general rights and responsibilities; France, Poland, Sweden; UK, etc.)
	6.3 Understading the value of data (data as a commodity)			YES (as per 6.1)	YES (in different forms, e.g 'The Price of the Free', see also 6.1)		YES (many resources explaining the importance of deadling with personal data e.g. Croatia, Czech Republik, Bulgaria, Polish, etc.)
	6.4 Knowing how to complain and obtain reddress	YES (Consumer section)	YES (archive of older resources)	YES (service section)	YES, see 6.2		YES (resources and information for almost each EU country e.g. France/INC)
	6.5 Looking after your (digital) money online		YES (see above)			YES (see above)	YES resources on several languages + since 2 years focus on online shopping issues including many resources in almost each EU languages and competitions with students exercices using innovative presentations technologies
	6.6 Detecting and preventing scams and fraud (another facet of safety)	YES (extensive)	YES (extensive)	YES	YES (several, often combined with security generally)	YES (scams/id theft)	YES (e.g. Italy/Federconsumatori; and many more)
	6.7 Filesharing and copyright infringement	YES (Consumer section)		YES - related to responsibilities, rights, responding to warnings	YES (e.g. 'not everything goes' for secondary schools, 'Copyright', etc)		YES (e.g Sweden + see above)
	6.8 Protecting young people from harmful media (children and adolescents)			YES (includes advertising, harassment, privacy)	YES (e.g. Youth and the Internet, Youth and mobile phone, etc.)		YES (e.g. Finland, Portugal, UK, EU, Romania; several others)
	6.9 Behavioural economics				YES 'Behavioural Economics experiments, economic decision situations, for secondary schools'		YES (many resources and blog posts combining financial literacy and digital issues)

[1] in example table based on DIGCOMP framework (dimension 1 and 2) section 2.3 online citizenship includes key consumer market transactions such as e-banking and shopping, as well as e-government. This should be reconsidered for a consumer competence framework	
[2] The consumer issues with regards to copyright differ from content creation - and relate to knowledge of the law when filesharing, responsibilities and how to respond to warnings	
[3] The sum of materials (60+) available on the site cover many aspects of the framework in various formats, though the majority of countries do not have materials covering all competencies at the present time.	
[4] Digital section under development	
[5] 80+ relevant materials can be found using theme filter 'media' and subject filter 'computer science/technology'; available for all school stages; rated according to certain criteria by the VZBV team.	
Many further materials focused on consumer protection/law related to media/internet can be found by searching the 'consumer law' theme	
Red highlight means issue covered/relevant for consumer digital competencies, but either placed in the wrong category or insuffiently covered	
Green - issues further elaborated for consumer digital competencies purposes	

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