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# **Studying the influence of e-personalisation on the online experience of consumers with disabilities: Ease of use as a source of pleasure**

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## **Abstract**

This research studies the online consumer experience and, more specifically, the role of design e-personalisation of e-commerce websites adapted to the needs of consumers with disabilities (perceptual, cognitive or physical). It examines the roles of ease of use and pleasure of use as explanatory mechanisms for the effects of design e-personalisation on e-commerce website reuse and positive word-of-mouth intentions. We propose an online consumer experience model based on perceived design e-personalisation and test it empirically with structural equations on a sample of 117 participants from a panel of French internet users who are more than 55 years old and have disabilities. The results highlight a serial double mediation of design e-personalisation on reuse and word-of-mouth intentions via ease of use and pleasure of use.

## **Keywords**

customers with disabilities, ease of use, pleasure of use, e-personalisation, online consumer experience, web interface design

## Introduction

‘The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect’,<sup>1</sup> says Tim Berners-Lee, the main inventor of the web and president of the non-profit standards body World Wide Web Consortium (W3C). The goal of universal access to the web requires companies to adapt the design – the appearance – of their interfaces (e.g. fonts, word spacing, colours and click zones) to users’ disabilities (perceptual, cognitive and physical) (Schildbach et al., 2010; Wildenbos et al., 2015).<sup>2</sup> This adaptation is particularly important for people with permanent disabilities, especially those related to ageing (Lord et al., 2015).<sup>3</sup> It can also be useful in the case of one-time disabilities, especially when there are changes in terms of noise, brightness or movement (Schildbach et al., 2010). The need to address the personalisation of web interfaces, as noted in the Marketing Science Institute’s research priorities for 2020–2022, has been reinforced by the massive use of online tools by all since the onset of the Covid-19 health crisis.<sup>4</sup> This research is aimed at gaining a better understanding of the online experience of consumers with disabilities when using personalised e-commerce website designs.

Multiple works on online personalisation – or e-personalisation – have been published focusing on various marketing techniques such as recommendations (Ansari et al., 2000; Fitzsimons and Lehmann, 2004; Ghasemaghahi et al., 2019; Ying et al., 2006; Zhang and Bockstedt, 2020; Zhang et al., 2020; Kalaighnam et al., 2018) or banner ads (Aguirre et al., 2015; Liao and Sundar, 2021; Tam and Ho, 2006; Tucker, 2014; Tran et al., 2020). That work focuses on adapting e-commerce website content, i.e. the web pages’ verbal elements, such as language style or descriptions of offers (Bleier et al., 2019), based on consumer preferences. Less research has focused on the effects of website design personalisation (Ansari and Mela, 2003; Hauser et al., 2009; Urban et al., 2014) or analysed the influence of algorithmic personalisation methods on consumers’ attitudinal and behavioural responses. However, these works do not study the underlying mechanisms that explain those responses. Yet, as Riegger et al. (2021) point out, studying those mechanisms is particularly important when e-personalisation (of the website

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<sup>1</sup> <https://www.w3.org/Press/IPO-announce>

<sup>2</sup> According to the World Health Organization, disability is ‘any restriction in the ability to perform an activity in a manner or within limits considered normal for a human being [...]

Disability, handicap or dependence express at different levels the consequences of deformities or accidents, diseases or ageing on the functioning of individuals in their daily lives.’ (Cambois and Robine, 2003, p. 62).

<sup>3</sup> As Sengès et al. (2019, p. 11) point out, ‘the effects of ageing accelerate between the ages of 50 and 60 [...]’. Our sample thus focused on individuals over the age of 50. Nevertheless, our results apply to any person with disabilities, regardless of their age.

<sup>4</sup> For example, during the spring 2020 lockdown period in France, those under 25 and over 65 surfed web pages equally well (Odoxa-CGI, 2020).

interface design) relies on innovative technologies, as consumers' reactions are then more unpredictable.

Since the pioneering work of Hoffman and Novak (1996), the concept of 'experience' has been central to models explaining consumer reactions to web interfaces (Bleier et al., 2019). Online customer experience is studied in two ways: either in cumulative form following multiple interactions (Martin et al., 2015; Micu et al., 2019; Pandey and Chawla, 2018; Rose et al., 2012; Tyrväinen et al., 2020) or following a specific interaction with a web interface, in which case it is also referred to as 'user experience' (Seckler et al., 2015). Although the 'cumulative' approach to online customer experience largely predominates in the marketing literature, Becker and Jaakkola (2020, p. 638) recommend studying the experience 'where customer responses are captured right after the interaction with the offering-related stimuli' 'to improve the validity of the findings' compared to surveys sometimes conducted several weeks after the interaction(s) with a website.<sup>5</sup> Following those recommendations, we focus on a 'specific' and real-time interaction with an e-commerce website to better understand the online customer experience. In terms of conceptualisation, two dimensions of the online customer experience – the cognitive and affective dimensions – have proven to be important in various study contexts (Waqas et al., 2021). While the implementation of these dimensions differs between works (e.g. Bleier et al., 2019; Martin et al., 2015; Rose et al., 2012), the study of online experience focused on a specific interaction invites us to focus our attention on the role of procedural knowledge (Squire, 1986) acquired while browsing a website and the emotional reactions it elicits: ease of use and pleasure of use, respectively.

Usability is an important barrier to accessibility to the internet and new technologies for people with disabilities, as highlighted by W3C.<sup>6</sup> It is also a known component of the experience with e-commerce websites (e.g. Kang and Namkung, 2019; Martin et al., 2015). Nevertheless, Nambisan and Watt (2011) point to the need 'to pursue a broader conceptualisation of customer experience, one that goes beyond the pragmatic/hedonic framework<sup>7</sup> that has dominated studies on online customer experience, and incorporates customers' sociability and usability experience as well' (p. 891).<sup>8</sup> Pleasure of use is another fundamental component of online experience (e.g. Bufquin et al., 2020; Huang et al., 2017), but it has been studied in conjunction with usability in a limited

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<sup>5</sup> For example, participants in the Martin et al. (2015, p. 86) study are surveyed up to 'twelve weeks' after interacting with e-commerce websites.

<sup>6</sup> 'currently, many sites and tools are developed with accessibility barriers that make them difficult or impossible for some people to use' (<https://www.w3.org/WAI/fundamentals/accessibility-intro/>)

<sup>7</sup> The pragmatic dimension corresponds to the utilitarian value of the experience.

<sup>8</sup> The application of usability to computerised environments primarily refers to the concepts of ease of use, ease of navigation and efficiency in interface use (Nambisan and Watt, 2011).

number of studies (e.g. Bilgihan et al., 2016; Krasnikoulakis et al., 2018; Pandley and Chawla, 2018). Those have taken a cumulative approach to the online consumer experience, not a specific approach (i.e. which occurs immediately after using an e-commerce website). Work in human–computer interaction (HCI) suggests that pleasure can be induced, not directly by an attribute of e-personalisation, but indirectly via the ease of use of the web interface (Mahlke, 2007). Therefore, we propose to study the role of the underlying mechanisms (i.e. ease of use and pleasure of use) in the online customer experience.

In line with models from environmental psychology, notably the stimulus–organism–response (SOR) model (Mehrabian and Russell, 1974), this work proposes to study the influence of perceived design e-personalisation on the behavioural intentions (i.e. reuse and positive word of mouth) of consumers with disabilities during their first interactions with an e-commerce website. Specifically, we examine the underlying mechanisms of the online customer experience (i.e. ease of use and pleasure of use) from the perspective of a dual serial mediation between perceived e-personalisation and behavioural intentions. To this end, we conducted a quantitative study with a population of internet users over 50 years old. As they used an e-commerce website with an integrated interface design personalisation algorithm which responded to their declared disabilities, this is a specific case of explicit design e-personalisation.

This research makes four main contributions to the literature. (1) This work contributes to the literature on online customer experience by studying the first moments of consumer interaction with an e-commerce website, via real-time measurements following the completion of a series of four tasks performed on the web interface. This approach stems from work in HCI that focuses on a specific interaction rather than cumulative interactions (Sellier, Poncin and Vanderdonckt, 2021). That leads us to integrate a procedural variable (i.e. ease of use) as a component of the online customer experience. (2) This work also proposes a conceptual clarification of e-personalisation – a determinant of interest in online customer experience (e.g. Tyrväinen et al., 2020; Zhang et al., 2014) – based on two axes of differentiation (implicit vs explicit and content-centric vs design-centric). (3) Our results enrich the technology adoption literature by validating the effects of a little-studied form of explicit e-personalisation, focusing on the design of an e-commerce website, on intention to reuse – an indicator of interface adoption (Miltgen et al., 2013) – and positive word-of-mouth intention, which is an indicator of interface loyalty (Moldovan et al., 2011). (4) Finally, we show that consumer pleasure can be induced, not directly by an interface element (in this case, e-personalisation) – as is the case in SOR-based models of online

customer experience involving so-called ‘atmospheric’ elements (e.g. Kim and Lennon, 2010; Shen and Khalifa, 2012) – but indirectly via ease of use.

## **Theoretical foundations**

### *Definition and characteristics of e-personalisation*

Personalisation is a relationship marketing strategy to tailor ‘products and purchase experience to the tastes of individual consumers based upon their personal and preference information’ (Chellappa and Sin, 2005, p. 181). Unlike customisation, the adaptation initiative in the case of personalisation comes from the company, not the consumer (Arora et al., 2008). In the multichannel era, personalisation is a fundamental element of the customer journey (Jain et al., 2021), which takes various forms, both physical and digital (Riegger et al., 2021). When it occurs on the internet, personalisation is referred to as ‘web-based’ personalisation (Li and Kalyanaraman, 2013) or ‘e-personalisation’ (Ansari and Mela, 2003; Lee and Lehto, 2010). The web marketing literature has been particularly interested in the personalisation of emails (Ansari and Mela, 2003; White et al., 2008; Sahni et al., 2018), online recommendations (Ansari et al., 2000; Fitzsimons and Lehmann, 2004; Ghasemaghaei et al., 2019; Ying et al., 2006; Zhang and Bockstedt, 2020; Zhang et al., 2020; Kalaignanam et al., 2018), banner ads (Aguirre et al., 2015; Liao and Sundar, 2021; Tam and Ho, 2006; Tucker, 2014; Tran et al., 2020; Urban et al., 2014) and newsfeed content (e.g. Chung et al., 2016). Although they share the common goal of providing the most appropriate response to each potential customer’s needs (Montgomery and Smith, 2009), these e-personalisation practices differ greatly in terms of approaches and methods (Li, 2016). Two main lines of differentiation of these practices have been identified, as illustrated in Table 1.

### INSERT HERE THE TABLE 1

A first axis of differentiation of web interface personalisation practices is the distinction between implicit and explicit personalisation (Fan and Poole, 2006). Implicit personalisation corresponds to an automatic adaptation of a website’s characteristics based on data inferred by the company regarding, for example, the user’s ‘favourites’, downloads or location (Chung et al., 2016; Aguirre et al., 2015; Fan and Poole, 2006). On the other hand, explicit personalisation is based on the consumer’s stated preferences and characteristics that are unique to them (Thurman and Schifferes, 2014), to which the company (or website designer) attempts to provide the most appropriate response. These two forms of personalisation use different methods: personalisation is

achieved through algorithmic systems described as ‘adaptive’ when it is implicit (Chung et al., 2016) and ‘adaptable’ (Thevenin et al., 2003) when it is explicit.

A second axis of differentiation of e-personalisation practices lies in the fact that they relate to website content and/or design (Benlian, 2015). Content refers to web pages’ verbal elements, such as language style or a description of an offer (Bleier et al., 2019), while appearance (or design) refers to the visual elements. This research focuses on the explicit personalisation of interfaces on the basis of consumer’s stated disabilities (perceptual, cognitive or physical) that characterise them. It thus concerns the adaptation of a website’s visual elements by, for example, increasing the size of the font and the click area, using adapted colours or removing animations (Bait and Folgieri, 2013; Peissner et al., 2012). To our knowledge, no marketing research has focused on this specific form of personalisation and its effects on consumer intentions (intention to reuse and positive word of mouth).

#### *The effects of e-personalisation*

The study of the effects of e-personalisation has increased with the advent of digital technologies (Rust and Huang, 2014). Work in this area highlights double-edged effects (Zeng et al., 2021) eliciting both favourable and unfavourable reactions from consumers (Riegger et al., 2021). Personalisation can certainly better meet consumers’ needs (Fan and Poole, 2006; Tam and Ho, 2006) and reduce their information-seeking efforts (Ansari and Mela, 2003), thus resulting in higher perceived value (Montgomery and Smith, 2009) and purchase intentions (Montgomery and Smith, 2009; Valenzuela et al., 2009), satisfaction (Valenzuela et al., 2009) and loyalty (Ansari and Mela, 2003; Bock et al., 2016). Nevertheless, personalisation may also increase consumers’ privacy concerns (Bleier and Eisenbeiss, 2015; Tucker, 2012, 2014; Riegger et al., 2021; Zeng et al., 2021) or trigger their feelings of vulnerability (Aguirre et al., 2015), discomfort (Tucker, 2012) or reactance (Fitzsimons and Lehmann, 2004; White et al., 2008), thus leading to counterproductive effects on the purchase decision (Aguirre et al., 2015; Bleier and Eisenbeiss, 2015; Nardini and Sela, 2019). Studies have shown the positive effects of web interface design e-personalisation on the number of clicks (Ansari and Mela, 2003; Urban et al., 2014) and purchase intention (Hauser et al., 2009; Urban et al., 2014). However, the underlying mechanisms to explain these effects are yet to be studied.

#### *The online experience: elements of conceptual clarification*

Holbrook and Hirschman proposed the notion of ‘consumer experience’ in two key articles. One dealt with hedonic consumer behaviour (Hirschman and Holbrook, 1982) and the other with laying the theoretical foundations of consumption’s experiential dimension (Holbrook and Hirschman, 1982). Experiential marketing focuses on maximising the consumer experience rather than on product utility. Pine and Gilmore (1998) were the first to refer specifically to the notion of ‘customer experience’ (p. 104), which they describe as a singular, memorable offering that is distinct from products and services. In the retail context, customer experience is defined as subjective and multidimensional, as it is a ‘multidimensional construct focusing on a customer’s cognitive, emotional, behavioural, sensorial and social responses to a firm’s offerings during the customer’s entire purchase journey’ (Lemon and Verhoef, 2016, p. 74). It encompasses all consumer interactions (or touchpoints) with a company’s or brand’s products or services (Verhoef et al., 2009). When these interactions occur in a digital environment (particularly on a website), it is referred to as the ‘online customer experience’ (Bleier et al., 2019; Martin et al., 2015; Nambisan and Watt, 2011; Pandey and Chawla, 2018; Micu et al., 2019; Rose et al., 2012).<sup>9</sup>

By integrating all a consumer’s digital touchpoints with a website, like the customer experience, the online customer experience is described as ‘a cumulative outcome’ (Rose et al., 2012, p. 308). In this sense, it differs from the HCI literature’s related concept of user experience or UX, which is the result of a ‘one person–product interaction in a specific context’ (Ceccacci et al., 2017, cited in Sellier et al., 2021, p. 230). User experience refers to ‘the perceptions and reactions of a user resulting from the actual and/or anticipated use of a system, product or service’ (ISO, 2019).<sup>10</sup> It is defined as ‘consequence of a user’s internal state [...], the characteristics of the designed system [...] and the context (or the environment) within which the interaction occurs’ (Hassenzahl and Tractinsky, 2006, p. 95). As recommended by Becker and Jaakkola (2020), we adopt an approach to the online customer experience that is focused on an interaction with an e-commerce website and, as such, oriented towards the use of technology.

### *Explanatory models of the online experience*

Many studies have been conducted on the online experience and proposed various theories for modelling it. Three theoretical anchors have received particular attention in the marketing literature. (1) The state of flow, which is defined as ‘a cognitive state experienced during online

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<sup>9</sup> When an ‘online customer experience’ focuses on e-commerce websites, some authors, such as Michaud Trévinal and Stenger (2014), refer to it as an ‘online shopping experience’.

<sup>10</sup> In French: ‘perceptions et réactions d’un utilisateur qui résultent de l’utilisation effective et/ou anticipée d’un système, produit ou service’ <https://www.iso.org/obp/ui/#iso:std:iso:9241:-210:ed-2:v1:fr>



navigation’ in a virtual environment (Novak et al., 2000, p. 22). The pioneering work of Hoffman and Novak (1996), and later studies (Gupta and Kabadayi, 2010; Barhorst et al., 2021), sought to model the experience of browsing (or consuming) the web in general. (2) A second stream of research, also initially based on the cognitive approach to experience, is based on the technology acceptance model (TAM) (Davis et al., 1989) and its extensions.<sup>11</sup> TAM research studies a range of interactions with different types of interfaces, including the web (Akar et al., 2019; Diwanji and Cortese, 2021), and views experience as ‘the passage of time from the initial use of a technology by an individual’ (Venkatesh et al., 2012, p. 161). That is an objective conceptualisation, not a subjective one. (3) A third stream, based on an initially affective approach, uses the SOR model (Mehrabian and Russell, 1974) to explain the online shopping experience (Chang and Chen, 2008; Eroglu et al., 2003; Fiore et al., 2005; Ha and Im, 2012; Hsu et al., 2012; Kim and Lennon, 2010, 2013; Luo et al., 2011; Shen and Khalifa, 2012; Yoo and Kim, 2012). These works consider that stimuli from the web environment influence the individual’s internal states, which in turn trigger responses in the form of a particular attitude or behaviour. Extensions of the SOR model (Rose et al., 2012; Martin et al., 2015; Tyrväinen et al., 2020) have incorporated personalisation and its effects on affective and cognitive internal states, as these are an ‘integral part of users’ experience on websites’ (Benlian, 2015, p. 231). Although our work is part of that third stream, it is positioned as a complementary approach based on the in-depth study of a specific interaction with an e-personalised web interface design instead of the accumulation of varied – sometimes multichannel (Tyrväinen et al., 2020) – customer experiences.

## **Conceptual model and hypotheses**

### *Perceived design e-personalisation and ease of use*

Ease of use is the degree to which an individual perceives navigating a target system (in particular, a web interface) as a ‘seamless and flowing environment’ (Lin and Lo, 2016, p. 43) and expects it to ‘be free of effort’ (Davis et al., 1989, p. 985). Ease of use is also a primary component of the experience with e-commerce websites (Becker and Jaakkola 2020; Ghose, 2002; Kang and Namkung, 2019; Kumar et al., 2004; Luo et al., 2011; Martin et al., 2015; Morgan-Thomas and Veloutsou, 2013; Nambisan and Watt, 2011; Rose et al., 2012) and contributes to the quality of that experience (Loiacono et al., 2002). However, psychology and marketing studies show that the fit between a marketing stimulus and a consumer characteristic, such as motivation (Cesario et al., 2004; Lee and Aaker, 2004) or information processing style

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<sup>11</sup> In particular, the Venkatesh et al. (2012) unified theory of technology acceptance and use enriches TAM, especially with the addition of hedonic motivation, and applies it to e-commerce.

(Thompson and Hamilton, 2006), reinforces the perceived fluency of this stimulus. Since the aim of personalisation is to match an offer with one or more of the consumer's needs, it is conceivable that it also triggers a perception of fluency, which is a foundation of usability (Nambisan and Watt, 2011). We can therefore assume that the consumer's perception of design personalisation positively influences their ease of use of a web interface. Thus, we formulate the following hypothesis:

**H1:** Perceived design e-personalisation positively influences website interface ease of use.

#### *Ease of use and pleasure of use*

When using a new digital technology, feelings of frustration, confusion or despair may arise when the consumer encounters technical problems (Mick and Fournier, 1998). However, the experience can also trigger positive emotions, especially as consumers gain a sense of control as they progress through the learning process. Pleasure when using the interface is a fundamental component of the online experience (Chang and Chen, 2008; Eroglu et al., 2003; Fiore et al., 2005; Ha and Im, 2012; Hsu et al., 2012; Kim and Lennon, 2010, 2013; Luo et al., 2011; Shen and Khalifa, 2012; Yoo and Kim, 2012). It is defined as the intensity with which an individual experiences joy or contentment in using a website (Eroglu et al., 2003). Adapting the work of Broach et al. (1995), who focused on television commercials, Lin and Lo (2016) found that the ease of use of a website positively influences consumers' pleasure of use, which then positively influences their desire to purchase the product promoted on the website. A similar result is obtained for products with interfaces (Lee et al., 2011). These results can be interpreted in the light of neuroscience research. When individuals are exposed to easily interpretable environments, as is the case with an easy-to-use website, the associations they make with previous experiences are increased, thus leading to a greater release of pleasure-producing endorphins (Biederman and Vessel, 2006). As Lin and Lo (2016) report, '[i]f little effort is needed to acclimate to the site's design and obtain the requisite information, the user will experience pleasure [...] when browsing' (p. 43). Since ease of use refers to the effort consumers put into using a website (Davis et al., 1989), we envision that it positively influences the pleasure of using the website. Therefore, we formulate the following hypothesis:

**H2:** Website interface ease of use positively influences pleasure of use.

#### *Pleasure of use and intention to reuse*

Originating from TAMs, intention to reuse corresponds to the degree of intended use of a website and has been recognised as a predictor of actual reuse (Bhattacharjee and Sanford, 2006; Morris

and Dillon, 1996). It echoes other closely related terminologies such as the intention to return to (Cuny et al., 2015; Hsu et al., 2012) and revisit a previously viewed website (Fiore et al., 2005) or to browse it again (Luo et al., 2011). Intention to reuse is a key indicator of new technology adoption (Shih and Venkatesh, 2004). Mehrabian and Russell (1974) postulate the existence of a relationship between an individual's internal states elicited by external stimuli and their behaviours. In particular, pleasure of use of an e-commerce interface exerts a positive and direct influence on the consumer's satisfaction (Im and Ha, 2011), purchase intention (Fiore et al., 2005; Luo et al., 2011; Yoo and Kim, 2011) and intention to use the interface during subsequent browsing (Davis et al., 1992; Fiore et al., 2005; Luo et al., 2011). Thus, we posit the following hypothesis:

**H3:** Pleasure of use positively influences the intention to reuse the website interface.

#### *Intention to reuse and positive word of mouth*

Applied to the web context, word-of-mouth intent, also known as electronic word-of-mouth intent, electronic word of mouth or eWOM, is defined as 'any positive or negative statement made by potential, actual or former customers about a product or company which is made available to a multitude of people and institutions via the internet' (Hennig-Thurau et al., 2004, as cited in Castellano and Duto, 2017, p. 43). When the notification is positive, Berger (2014) refers to it as positive word-of-mouth intent. This variable is known to be a good predictor of consumer loyalty (Moldovan et al., 2011), sales (Chevalier and Mayzlin, 2006), e-reputation (Castellano and Duto, 2017) and business performance (Finn et al., 2009). The degree of anticipated use of an interface is an indicator of satisfaction (Shih and Venkatesh, 2004), which the consumer can share with other consumers (Moldovan et al., 2011). Notably, Luo et al. (2011) show that the intention to reuse an online retail website positively influences positive word of mouth towards it. Thus, we propose:

**H4:** Intention to reuse the web interface positively influences positive word-of-mouth intention.

#### *Proposed model versus competitive model*

We propose a renewed approach to web marketing which considers the ease of use of new technologies as a trigger of consumer pleasure during an online experience. In our study, the perceived e-personalisation of a website's design is conceived as the driver of consumer behavioural intentions via the ease of using the website to find the information sought and the resulting pleasure induced. This means that not only the products and services presented that play

a key role contribute to the online experience but also the learning and intrinsic pleasure derived from using the web interface. This approach is particularly suitable for a public with disabilities since adapting the website (i.e. perceived design e-personalisation) allows users to improve their procedural skills for adequate use of the web interface (i.e. ease of use). That can then lead customers to experience more pleasure when using an e-commerce website (i.e. pleasure of use). This approach led us to establish the proposed model (see Figure 1).

Competitive modelling, based on work in web marketing (Hsu et al., 2012; Kim and Lennon, 2010, 2013), proposes a direct influence of interface stimuli (i.e. design e-personalisation) on pleasure of use (rather than an indirect influence via ease of use, as we postulate in the proposed model). Researchers using quantitative methods have advocated a model comparison strategy to establish the most appropriate model (Bollen and Long, 1992). Therefore, to compare these two models, we propose to establish a competitive model that simultaneously includes the causal pathways: (1) ‘personalisation–facilitation–pleasure–intentions’ and (2) ‘personalisation–facilitation–intentions’. Based on the SOR model (Rose et al., 2012) and Mahlke’s (2007) work in HCI, the first pathway (proposed model) is preferred, since it postulates a dual serial mediation of ease of use and pleasure of use between a website attribute – here, the e-personalisation of the design – and the intention to reuse it. We propose that:

**H5:** There is a double mediation in series between the perceived design e-personalisation and the intention to reuse it via ease of use and pleasure of use.

Figure 1 shows the set of assumptions in the proposed model and illustrates the alternative causal pathway added to establish the competitive model.

INSERT HERE THE FIGURE 1

## Method

A quantitative study was conducted with internet users over 50 years old with disabilities to test the proposed and competitive models, as well as all the hypotheses (see Figure 1). Structural equation modelling (SEM) was applied using the maximum likelihood method via IBM-AMOS-SPSS-27 software.

### *Stimulus*

*The website and its adaptations.* The stimulus is an online reservation website of a real hotel in Lyon (as the research project partner wished to remain anonymous, we refer to it as Hotel R). The website and the tool allowing the personalised adaptations were developed by a team of three

researchers specialising in HCI engineering. It is a prototype website consisting of: (1) a home page introducing the hotel; (2) a page detailing the hotel's rooms and suites (brief and detailed descriptions); (3) a page presenting the restaurant and bar services; (4) a page presenting the breakfast service; (5) a page presenting the hotel's various other services (Wi-Fi, television, internet access, etc.); (6) a page showing the hotel's location, coordinates and means of access; (7) a reservation page with a form for selecting the room and period of stay (see Figure 2). All the website pages can be adapted based on individual characteristics related to disabilities reported by the participants. Appendix A presents illustrations of website adaptations based on reported disabilities. Note that the adaptations are fast (80 ms/page) and do not interfere with navigation.

INSERT THE FIGURE 2 ABOUT HERE

*The adaptive tool for personalising the website.* To ensure the incorporation of adaptation rules according to individuals' declared disabilities, development of the adaptation tool mainly relied on three important documents published in the field: (1) the 2018 Web Content Accessibility Guidelines (WCAG), which became the ISO standard<sup>12</sup> and includes generic recommendations to make web content more accessible for people with disabilities, indeed all users, around four principles (perceivable, functional, understandable and robust), and two other documents offering specific recommendations, (2) the 2010 Web Accessibility Initiative (WAI-AGE) for seniors, and (3) the 2016 Accessibility Requirements for People with Low Vision (EAPM). Table 2 shows the interface accommodations for each specific need related to an individual characteristic. It is commonly accepted that adaptations are needed for older users (Hanson, 2011). The adaptations were based on the WAI-AGE (2010) recommendations. The '56+' criterion was selected based on other studies using that criterion (Gan et al., 2005) and noting differences in how digital tools are used by (Fok et al., 2011; Yahao, 2012) or designed for (Hassan and Nasir, 2008) that age group. The tool, using a fuzzy logic engine<sup>13</sup> developed by CEA Tech,<sup>14</sup> allows all the characteristics to be considered before proposing an adapted interface using rules based on weighted averages. For example, if the user indicates being 20 years old and having low acuity, the proposed font size will be 20 (instead of the standard size 16), whereas size 22 would be used if the user is 70 years old and has low acuity.

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<sup>12</sup> ISO/IEC 40500:2012 – <https://www.iso.org/fr/standard/58625.html>

<sup>13</sup> Fuzzy logic can be seen as an extension of classical Boolean logic allowing the uncertainty and imprecision of the considered features' values to be taken into account. While classical logic considers only two values (0 and 1 for 'false' and 'true'), fuzzy logic considers an infinite set of real values between 0 and 1. This logic thus allows us to get closer to human reasoning and be able to deal with some ambiguities of natural language (Giuffrida, 2020).

<sup>14</sup> <https://www.cea-tech.fr/cea-tech>

## INSERT TABLE 2 HERE

### *Protocol and sample*

*Data collection.* Data collection was conducted through two interfaces (see Figure 3 for an illustration of the steps in the study protocol): (1) Qualtrics, for the online survey, and (2) the Hotel R website. The participants started the study on the online survey interface, where they answered a few filter questions regarding: ‘Have you ever stayed at the Hotel R?’ (allowing us to interview only respondents who had never stayed there), age, gender (to maintain balance on the gender variable and retain participants over 50 years old) and the last four digits of their mobile phone numbers (to link the two parts of the study). The study was then presented in more detail. The participants were told that special needs related to stated disabilities would be considered when navigating a hotel website. A hyperlink would then allow them to reach the hotel’s website on a new page. On the hotel’s website, the participants were first asked to fill out a form about their potential disabilities to determine what adaptations were needed. This form consisted of eight questions addressing the eight disability criteria: (1) level of visual acuity with glasses (four steps, from ‘normal’ to ‘poor’); (2) computer literacy (four steps, from ‘normal’ to ‘poor’); (3) ability to read written information (four steps, from ‘normal’ to ‘poor’); (4) ability to concentrate (four steps, from ‘normal’ to ‘poor’); (5) level of hand tremor (four steps, from ‘not at all’ to ‘a lot’); (6) level of dyslexia (four steps, from ‘not at all’ to ‘a lot’); (7) colour blindness (two categories, ‘no’ or ‘yes’), with the type of colour blindness specified if the ‘yes’ response was selected; and (8) age category (‘18–55 years’ or ‘56 years and over’).<sup>15</sup> Participants also provided their gender and the last four digits of their mobile number again (to link the two parts of the study). Once this form had been completed, they accessed the personalised version of the website based on their previously stated specific needs.

To ensure the most similar online experiences possible among the participants, they were asked to complete a series of four searches on the website. The tasks to be completed were detailed on the survey interface. For example, one task was: ‘After searching the Hotel R website, indicate the name of the subway stop closest to the hotel to get off. Select your answer from the list of choices provided: Terreaux stop, Bellecour stop, Vieux-Lyon stop or Massena stop’ (details of the four tasks are available in Appendix B). Once the tasks had been completed, the participants were asked to close the hotel website. The study then concluded with the survey interface containing the model variables to evaluate their perceived online experience (positive

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<sup>15</sup> Age information in numerical form was also requested in the online survey.

word of mouth, intention to use again, pleasure of use, ease of use and perceived e-personalisation). They also assessed their familiarity with booking hotels online and the city of Lyon, their involvement in the task and their self-efficacy. Only one correct answer was possible for each task. A measure of the error rate was calculated (from zero errors to four errors). The average error rate was 0.55 (SD = .92), with 65.0% of the participants making no errors, 23.1% making one error, 6.8% making two errors, 2.6% making three errors and 2.6% making four errors. Participants spent an average of 5.49 min (SD = 15.27) on the four tasks (i.e. average time spent on the page presenting the four tasks to be completed).

INSERT HERE THE FIGURE 3

*Sample.* The sample, obtained via a Qualtrics panel, consists of 117 French people (53% men and 47% women) with ages ranging from 50 to 83 years and an average age of 61.7 years (standard deviation: 7.7). To verify the reliability of the responses, we included a reading verification question (participants who did not pass this verification were directed to the end of the study). Descriptive statistics for each of the variables in the analysis are shown in Appendix C (means, standard deviations and correlations). Regarding the participants' reported disabilities, Table 3 presents the frequencies and percentages for each criterion related to an adaptation (or non-adaptation) of the Hotel R website. For example, 72.65% of the participants experienced an adaptation addressing the 'concentration' criterion (i.e. they declared a level lower than 'normal').

INSERT HERE THE TABLE 3

### *Measurement scales*

The scales and labels for each item are presented in Appendix D. Regarding the web interface characteristics, the perceived design e-personalisation was assessed via a scale adapted from the work of Aguirre et al. (2015), with three items of seven-point Likert-type scales (ranging from 1 = 'Strongly disagree' to 7 = 'Strongly agree'): 'This website matches my personal needs in terms of navigation' (PERSO1), 'This website takes into account my personal difficulties in terms of navigation' (PERSO2) and 'This website offers navigation adapted to my personal situation' (PERSO3).

Concerning the online experience, *ease of use* and *pleasure of use* are the two components of the online experience and the two mediators of the proposed model. Ease of use is measured via a three-item, seven-step Likert-type scale adapted from Lee et al. (2011): 'This website allows you to find what you are looking for quickly' (USA1), 'This website does not require any particular effort to access information' (USA2) and 'This website offers easy navigation' (USA3). The

pleasure of use is measured via an affective product evaluation scale adapted from the work of Steenkamp and Geyskens (2006). It comprises a three-item, seven-point Likert-type scale: ‘When I browse this website, I feel that this website is... nice to use’ (PLA1), ‘pleasant to use’ (PLA2) and ‘satisfying to use’ (PLA3)’.

For behavioural intentions, the measurement scale for *intention to reuse* is the two-item, seven-point scale from Venkatesh (2000) and Venkatesh et al. (2012): ‘I intend to go to this website’ (INT1) and ‘I will ask to receive commercial offers from this website’ (INT2). The measurement scale for *positive word of mouth* is adapted from the work of Grappi, Romani and Bagozzi (2013) and Maxham and Netemeyer (2002). It is a three-item, seven-point Likert-type scale: ‘I intend to say positive things about this hotel’ (BAO1), ‘I intend to recommend this hotel to my family and friends’ (BAO2) and ‘I intend to speak well of this hotel to my family and friends’ (BAO3).

For the covariates, the measurement scales of *familiarity with online hotel booking* and *familiarity with the city of Lyon* are adapted from the Machleit et al. (1993) scale used by Kent and Allen (1994). Each of these scales has three items with seven points. Familiarity with online navigation, i.e. individuals’ skills in searching for information online (Marchioninin, 1995; Xia and Kimmelb, 2004), is based on the familiarity with a task related to the use of technological tools (Goodman and Garber, 1988; Espinosa et al., 2007). It is a one-item, seven-point Likert-scale.

For *self-efficacy*, the scale used is derived from the work of Shih and Venkatesh (2004). It consists of a one-item scale, where the participants assess themselves on a sliding scale from 0% to 100%. For *involvement in the task*, we use a one-item, seven-point scale adapted from Martin et al. (2009). It measures the degree of focus on the tasks to be accomplished on the website.

## **Results**

### *Evaluation of the measures*

To assess the quality of the measurement, we tested the measurement model using confirmatory factor analysis (CFA). The quality indices used were those recommended by Hu and Bentler (1998). Only the multi-item scales were included in the analysis. The CFA results allow us to determine the convergent and discriminant validity. Based on the measurement model, we also modelled a method factor to measure the method bias. The CFA results are presented in Appendix C. They indicate an acceptable degree of fit of the measurement model to the collected data:  $\chi^2/149 = 1.63$ ; RMSEA = 0.068; TLI = 0.954; CFI = 0.964; SRMR = 0.059. The results for the estimated parameters are between 0.7 and 0.9, with a significance lower than 0.001, thus



confirming the relevance of each item included in the measurement model. The Bollen–Stine bootstrap test confirmed the robustness of the model ( $p = 0.109$ ).

*Reliability and validity of the scales.* All the scales had acceptable measures of reliability and convergent and discriminant validity (see Table 4). *Reliability* was satisfactory for each construct, with values above the 0.70 cutoff, in accordance with Nunnally's (1978) recommendations. Following the Fornell and Larcker (1981) recommendations, the *convergent validity* is confirmed by an extracted variance with values above 0.50 for each construct. As the extracted variance of each construct is greater than the correlation squares, the *discriminant validity* is established. All constructs can therefore be used for hypothesis testing.

INSERT TABLE 4 HERE

*Method bias size.* Two tests were performed to assess the common method bias effect: (1) Harman's single factor test via an exploratory factor analysis (EFA); and (2) the common method factor test via a CFA. For the EFA, with e-personalisation through seven factors (i.e. perceived e-personalisation, ease of use, pleasure of use, intention to reuse, word of mouth, familiarity with online booking and familiarity with the city of Lyon), each item factors only with the construct with which it is associated. The total variance explained for seven factors is 90.3%, against 41.2% for a single factor. This first test tends to show an absence of method effect. The CFA confirms these conclusions, since the variance extracted for the common method factor is 7.7%, which is less than the 15.8% average found in the social sciences (Cote and Buckley, 1987).

*Testing the hypotheses (H1 to H4)*

SPSS-AMOS 27 software was used to test the proposed model through SEM applying the maximum likelihood method. To interpret the results, we followed the recommendations of Hu and Bentler (1998) and Iacobucci (2010) for SRMR. The results for the proposed model are in line with those quality standards and are thus acceptable:  $\chi^2/208 = 1.447$ ; RMSEA = 0.062; TLI = 0.959; CFI = 0.966; SRMR = 0.068. Table 5 presents the results in detail.

INSERT TABLE 5 HERE

Website personalisation significantly and positively influences ease of use (H1:  $\beta = 0.46$ ;  $p = 0.000$ ). Hypothesis H1 is therefore validated. Ease of use positively and significantly influences pleasure of use (H2:  $\gamma = 0.81$ ;  $p = 0.000$ ). Hypothesis H2 is therefore validated. In turn, pleasure of use significantly and positively influences the intentions to reuse the website (H3:  $\gamma = 0.48$ ;  $p = 0.000$ ). Hypothesis H3 is therefore validated. Intentions to reuse, in turn, positively and

significantly influence positive word of mouth (H4:  $\gamma = 0.80$ ;  $p = 0.000$ ). Hypothesis H4 is therefore validated.

#### *Testing the competitive model (H5)*

The competitive model consists in modelling an alternative pathway between the perceived e-personalisation of the website design and the intention to reuse it. This model therefore incorporates two mediation pathways, namely personalisation–ease–pleasure–intention and personalisation–pleasure–ease–intention. As with the proposed model, the competitive model provides acceptable results (see Table 5):  $\chi^2/205 = 1.46$ ; RMSEA = 0.063; TLI = 0.957; CFI = 0.966; SRMR = 0.065. However, the comparison between the proposed model (300.9 / 208) and the competitive model (299.9 / 205) shows a difference in  $\chi^2$  of 1 for 3 degrees of freedom. This difference is not significant ( $p = 0.801$ ). As it is more efficient than the competitive model, the proposed model is preferred.

We followed the recommendations of Zhao et al. (2010) and Preacher and Hayes (2004) to test serial double mediation via ease and fun. Thus, we focused on bootstrapping the indirect effects test using SEM. The overall results of the indirect effects tests are presented in Table 6. The results indicate that, overall, all the indirect effects are statistically significant. In particular, the indirect effect proposing serial mediation of the perceived website design e-personalisation on positive word of mouth is significant and positive ( $b = 0.14$ ;  $p = 0.003$ ), with a 95% confidence interval ( $b$  between 0.08 and 0.26), which excludes the value zero. Hypothesis H5 is therefore validated.

INSERT TABLE 6 HERE

## **Discussion**

### *Theoretical implications*

Based on the SOR model and enriched by contributions from the HCI literature, the empirical results confirm our conceptualisation of the online customer experience and the influence of perceived design e-personalisation on behavioural intentions via the underlying mechanisms (ease of use and pleasure of use) of the online experience of consumers with disabilities. The serial mediation – via ease of use then pleasure of use – of perceived design e-personalisation on behavioural intentions is also confirmed.

By focusing on a specific real-time interaction of consumers with an e-commerce website (*concurrent-use* approach), as advocated by Becker and Jaakkola (2020), this work contributes to

the literature on online customer experience. Indeed, marketing research is generally interested in the cumulative experiences of consumers resulting from the recollection of one or several past experiences with a web interface (*memory-based* approach). Such studies vary in terms of the protocol implemented depending on: the *time elapsed* between the study and the experience, ranging from ‘directly after’ (e.g. Bleier et al., 2019; Heller et al., 2019; Krasonikolakis et al., 2018) to several weeks after (e.g. Cachero-Martinez and Vazquez-Casielles, 2021), or even several months after (e.g. Bilgihan, 2016; Chen and Yang, 2021; Juaneda-Ayensa et al., 2016; Kuppelwieser and Klaus, 2021); and the specifics of the object of study, with surveys conducted on an experience with a specific brand (e.g. Zara in Juaneda-Ayensa et al., 2016; Walmart in Quach et al., 2020) or on a more global past experience (e.g. a travel agency service in Rajaobelina, 2018, or a hotel booking in Bilgihan, 2016). That diversity of studies arises from a broad conceptualisation of online customer experience. Conversely, studies focusing on a specific web interaction, mostly in the HCI literature, propose the use of a specific interface accompanied by tasks to be performed. However, the first interactions with a website are crucial, as they allow consumers to form their initial impressions, which ‘have a large impact on people’s subsequent attitudes and behaviour’ (Jiang et al., 2016, p. 232). Our results thus contribute to the marketing literature by offering a complementary approach to the online customer experience focusing on consumers’ first interaction with a web interface.

Our results confirm the serial mediating role of the cognitive (ease of use) and affective (pleasure of use) dimensions of the online customer experience centred on consumers’ specific interactions with a web interface. This dual serial mediation, i.e. the ease–pleasure sequence, echoes the ‘Aha!’ experience proposed by Lakshmanan and Krishnan (2011) in reference to:

the emotional reaction that typically occurs at a moment of sudden insight into a problem or other puzzling issue. It is the experience one would have upon realising, for example, how to fix a computer problem, master a dance step or resolve some other difficulty. (American Psychology Association, 2015)

Thus, consumers with (one-time or permanent) disabilities will learn to manipulate a product (or a website, in this case) when first using it, understand how it works and how to find useful information, and develop procedural skills which will allow them to gain understanding of how the product works for them (i.e. usability). However, while ease of use – the oldest variable studied in TAMs – is essential to the online experience, it is not sufficient. It must trigger pleasure to lead to behavioural intentions. This double serial mediation therefore emphasises the centrality

of ease of use then pleasure of use in understanding the online customer experience and its impact on intentions.

This study contributes to the literature on e-personalisation by clarifying the axes of differentiation: one is based on how the interface is personalised (implicit vs explicit); the other considers the object of personalisation (content vs interface design). Our results indicate that the influence of the perceived e-personalisation of the interface design on pleasure of use for consumers with disabilities is not direct; the influence is indirect via ease of use. Comparing the proposed and competitive models clearly highlights the mediation pathway at work within the consumers' online experience: e-personalisation–ease–pleasure–intentions. Our results thus complement those of previous studies investigating the influence of content personalisation and the dimensions (cognitive and affective) of the customer experience understood in a holistic and cumulative manner (Rose et al., 2012; Martin et al., 2015; Tyrväinen et al., 2020). This work also differs from studies on web interface design personalisation (Ansari and Mela, 2003; Hauser et al., 2009; Urban et al., 2014) by considering consumers with specific adaptation needs and testing the mediating roles of ease and pleasure in an e-commerce context. Moreover, our results complement previous work on web marketing that show a direct influence of interface characteristics on pleasure (e.g. Hsu et al., 2012; Kim and Lennon, 2010, 2013).

For the dependent variables, this work complements that on technology adoption (Davis et al., 1989; Bagozzi et al., 1992) by studying consumers' behavioural intentions in terms of intention to reuse and positive word-of-mouth intention. These variables are particularly important when looking at experiential marketing. Our results show that e-personalisation of an e-commerce website indirectly and significantly influences the intention to reuse the website. That is a good indicator of interface adoption (Miltgen et al., 2013). Our results also highlight that e-personalisation indirectly and significantly influences positive word-of-mouth intention, which is a good indicator of interface loyalty (Moldovan et al., 2001).

### *Managerial implications*

The use of web interfaces had become a daily practice for all consumers even before the current health crisis. The ease of use can depend on the consumers' disabilities (perceptual, cognitive or physical). Our work studies the online experience of consumers with disabilities when using a web interface that is new to them. In doing so, this study combines knowledge of marketing and HCI, as is recommended in a context with a significant technological component (Hoyer et al., 2020). In the context of the health crisis, genuinely interdisciplinary collaborations appear to be

essential for providing solutions to current societal challenges (Wetzels, 2021), especially those related to web accessibility for all due to the digitalisation of the economy.

To improve the online experience and ensure access to the web for all, companies play an important role in providing personalised access to their web interfaces. For example, companies can integrate an accessibility solution into their interfaces (e.g. a widget developed by companies such as UserWay or accessiBe) that offers, as in this research, an explicit personalisation menu (font size, font spacing, dyslexia, etc.). Our data is derived from the use of an explicit personalisation engine being developed by computer science researchers (Giuffrida, 2020). The originality of the data, collected from a population of internet users over 50 years old with disabilities, and the stimulus of our study allows us to test this technology in an e-commerce website usage situation and to establish the perceived design e-personalisation's influence mechanisms. By acting at this early technological stage, marketing can have a real impact on technological developments by applying its expertise on consumers' perceptual, affective and behavioural mechanisms to the challenge of making the navigation experience easier and more pleasurable for people with disabilities.

To build consumer loyalty from visits to e-commerce websites, managers must ensure that they offer their visitors an experience that is explicitly personalised to their specific needs, thus providing greater ease of navigation, which in turn promotes a sense of pleasure, which encourages users to return to the website and spread favourable word of mouth. The eventual goal of the engine development is to be able to implement a dynamic personalisation engine that adjusts to the users' (undeclared) needs via the capture of possible inaccuracies in the commands, including those caused by hand tremors.

However, some adaptations, e.g. to dyslexia or to colour blindness, will be accessible only after user self-declaration or testing. One can then imagine the recording of this information by the internet user in their unique authentication profile (Single sign-on, Google Account, Live ID, Yahoo ID, Auth0 or ORCID), which would then facilitate their browsing experience on the various websites they access. France's High Council for Family, Childhood and Ageing noted in its 2019 report the existence of a digital divide showing the difficulties that some of the population have when using computer tools and their need for greater support. The desired universality of the web implies access to all, regardless of disability, so the personalisation of web interfaces is set to become a crucial issue for companies of the future. However, some of the technological aspects required to achieve such experiential developments are yet to be invented. For this, the close cooperation of the various authorities, personal assistance associations and companies, both

private and public, would be needed to ensure that web resources can be made accessible to all without distinction.

### *Limitations and future research directions*

This research has three main limitations. First, it was conducted on a specific website, for a high-end hotel in Lyon, and with a specific audience, i.e. internet users who are over 50 years old and have disabilities. The proven adequacy of the e-personalisation model for online experience is yet to be replicated for other types of interface (e.g. more utilitarian ones) and for those with an inherently lower level of pleasure of use. It also needs to be tested with users whose personalisation needs relate to the context of use – such as luminosity, noise, atmosphere or hardware – rather than to individual disabilities. We studied the online experience in a situation of use (i.e. by giving a series of tasks to be performed and by interviewing the participants directly after using the interface). The study should be extended by adding contextual variables, such as hedonic or utilitarian purchase motivations, and assessing their influence on the online experience, especially in a less controlled context of actual purchase. Furthermore, other than time spent and task error rate, this research relies primarily on explicit measures. It could be complemented by implicit measures performed during interaction with the website (e.g. eye tracking or measurement of facial expressions), thus allowing for a finer understanding of the online experience throughout the interaction (Courtemanche et al., 2017; Alvarez et al., 2020).

Second, we targeted consumers over 50 years old with disabilities on the assumption that they would have a greater need for web interface adaptations. Ageing is a complex process that impacts the human body and leads to biological and psychological changes. It has been shown that individuals with a subjective age lower than their biological age have better health, cognitive functions and a higher level of well-being (Mitina et al., 2020). This research considered only the biological age of individuals, without considering their psychological age. This variable could be incorporated as a moderator of the influence of e-personalisation on behavioural intentions. Finally, we incorporated two key dimensions (i.e. cognitive and affective) of online experience, as proposed by Waqas et al. (2021), into this research. We associated those dimensions with two variables (ease of use and pleasure of use). Other dimensions of experience (e.g. physical, sensory and social) could be added, especially in the context of an omnichannel strategy combining online and offline experiences.

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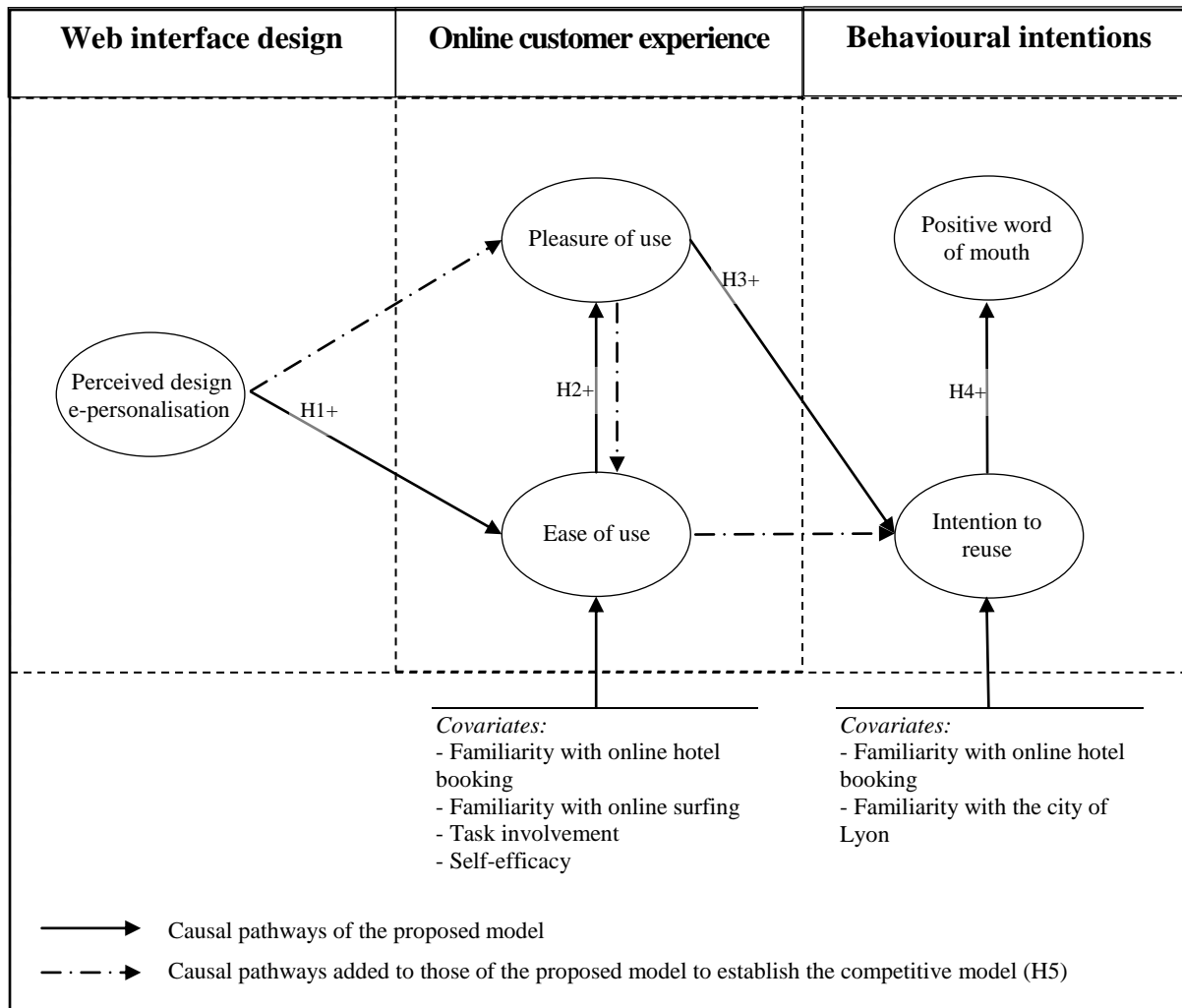
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**Figure 1. Online customer experience model based on perceived design e-personalisation**

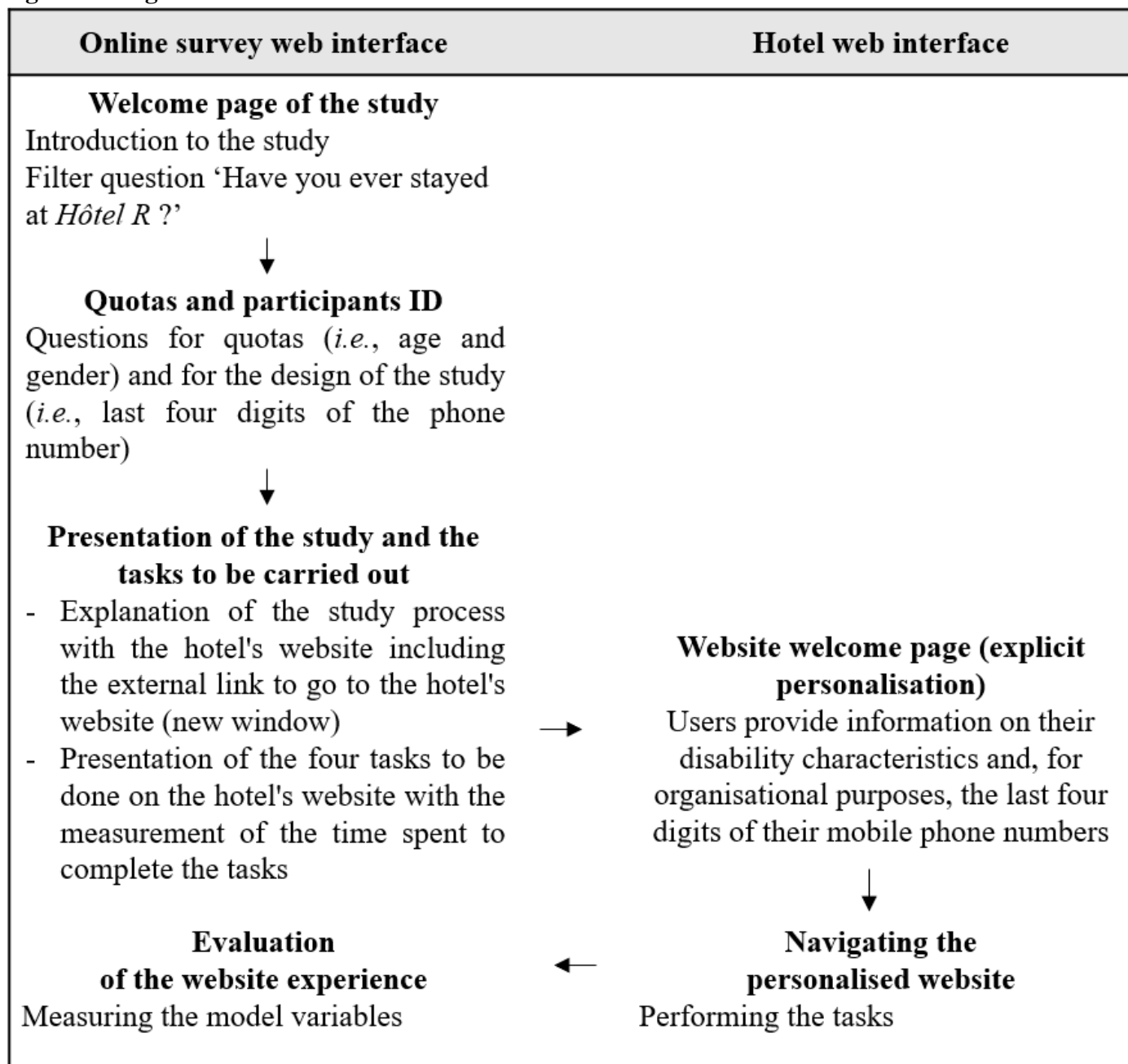


**Figure 2. Screenshots of the hotel website\* home and room pages (without personalised adaptation)**



\* As the research project partner wished to remain anonymous, we refer to the hotel as 'L'Hôtel R' on the website.

**Figure 3. Stages of data collection**



**Table 1. Illustration of the diversity of research on e-personalisation in marketing (adapted from Chung et al., 2016)**

Reference	Object of personalisation	Personalisation method	Main results	E-personalisation			
				Implicit	Explicit	Content	Design
Current study	Hotel web pages	Fuzzy logic	Positive influence of personalisation on the intention to reuse and recommend the interface via ease of use and pleasure of use.	No	Yes	No	Yes
Zeng et al. (2021)	SMS and vouchers on a distributor's customer account	Not specified <sup>1</sup>	Positive influence of an initial 'self-disclosure' stage on the success of a personalised promotional campaign (thus helping to resolve the personalisation/privacy paradox).	No	Yes	Yes	No
Tran et al. (2020)	Brand advertising on Facebook	Not specified <sup>2</sup>	Positive influence of perceived personalisation on brand equity via brand identification and connection of self to brand.	Yes	Yes (Study 2)	Yes	No
Tyrväinen et al. (2020)	Promotional offer from a distributor	Not specified <sup>2</sup>	Positive influence of personalisation on loyalty via the customer experience.	Yes	Yes	Yes	No
Kang and Namkung (2019)	Coffee brand mobile application	Not specified <sup>2</sup>	Positive influence of personalisation on perceived benefit, perceived risk and perceived ease of use.	Yes	No	Yes	No
Maslowska et al. (2016)	Newsletter for a university sports centre	Filters	Effect of personalised advertising on attention, cognitive response and attitude towards the message via perceived personalisation.	Yes	No	Yes	No
Chung et al. (2016)	News on mobile devices	Bayesian classification	Improved performance of mobile devices' adaptive personalisation by considering social networks.	Yes	No	Yes	No
Urban et al. (2014)	Product banner ads on news / product review websites	Morphing algorithm based on dynamic programming optimisation and Bayesian models	Positive influence of banner ad morphing on click-through rate, brand attitude and purchase intention.	Yes	No*	Yes	Yes

Chung et al. (2009)	Music on a digital audio player	Adaptive personalisation system with four components linked to statistical models	Superior adaptive personalisation performance to that of the alternative system.	Yes	No	Yes	No
Hauser et al. (2009)	Web pages for a telecom operator	Dynamic programming and Bayesian inference	Adapting interface design to the user's cognitive style increases purchase intention.	Yes	No	Yes	Yes
Ying et al. 2006	Online movie recommendation for a recommendation system	Hierarchical Bayesian model	Improving the recommendation algorithm by considering missing values and various sources of heterogeneity.	No	Yes	Yes	No
Zhang and Krishnamurthi (2004)	Online price promotions for a retail e-commerce website	Statistical model (with purchase incidence, brand choice and quantity) to develop a promotion optimisation procedure	The proposed personalisation model increases the effectiveness of the online retailer's promotional practices.	Yes <sup>+</sup>	No	Yes	No
Ansari and Mela (2003)	Advertising emails for a website	Hierarchical Bayesian model	Email personalisation increases web traffic.	Yes <sup>+</sup>	No	Yes	Yes
Ansari et al. (2000)	Online movie recommendation for a recommendation system	Hierarchical Bayesian model	Implementation of a personalised recommendation model based on the consumer's stated preferences.	No	Yes	Yes	No

<sup>1</sup>Data from a customer account; <sup>2</sup>Data from memory-based experience; \* The authors use a calibration phase of the consumers' cognitive styles, based on declared information; <sup>+</sup> Personalisation model implemented according to captured user data.

**Table 2. Adaptations of the interface based on declared disabilities**

<b>Declared disabilities</b>	<b>Web interface adaptation</b>
<b>Low visual acuity</b> (EAPM, WAI-AGE, WCAG, Peissner et al., 2012)	Increase the font size, click area and spacing between words and letters Decrease text size (avoid large blocks of text) Numbered lists No animation
<b>Poor computer literacy</b> (Peissner et al., 2012)	Increase the level of guidance (e.g. arrow explaining an animation) Hyperlink turned into a button
<b>Poor ability to concentrate</b> (WCAG, Peissner et al., 2012)	Reduction of text volume (avoid large blocks of text) Removal of purely decorative elements (e.g. photos)
<b>Poor ability to read written information</b> (WCAG, Peissner et al., 2012)	Reduction of amount of text (avoid large blocks of text) Menus with icons
<b>High level of hand tremors</b> (Peissner et al., 2012)	Increase the size of the click area
<b>High level of dyslexia</b> (Bait and Folgieri, 2013; EAPM; WCAG)	Increase the spacing between words, lines and letters Numbered lists Left-justified text
<b>Presence of colour blindness</b> (EAPM)	Remove colours (achromate), greens (deuteranope), blues (tritanope) or reds (protanope)
<b>Age-related difficulties</b> for those over 56 (EAPM, WAI-AGE, WCAG, Peissner et al., 2012)	Increase the font size, click areas and spacing between words and lines Decrease amount of text (avoid large blocks of text) Numbered lists No animation



**Table 3. Frequencies and percentages of reported disabilities related (or not) to a hotel website adaptation**

<b>Incapacities</b>	<b>No adaptation</b>		<b>Adaptation</b>	
	<b>Frequency</b>	<b>Percentage</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Concentration</b>	32	27.35	85	72.65
<b>Age</b>	33	28.21	84	71.79
<b>Computer literacy</b>	41	35.04	76	64.96
<b>Visual acuity (with glasses)</b>	110	94.02	7	5.98
<b>Dyslexia</b>	116	99.15	1	0.85
<b>Hand tremor</b>	116	99.15	1	0.85
<b>Read written information</b>	117	100	0	0
<b>Colour blindness</b>	117	100	0	0

**Table 4. Reliability, convergent validity and discriminant validity**

Constructs	Squared correlation							
	AVE	PERSO	USA	PLA	INT	BAO	FRES	FLYO
<b>PERSO</b>	<b>0.73(a)</b>	<i>0.89(b)</i>						
<b>USA</b>	<b>0.87</b>	0.60(c)	<i>0.95</i>					
<b>PLA</b>	<b>0.92</b>	0.43	0.64	<i>0.97</i>				
<b>INT</b>	<b>0.67</b>	0.19	0.22	0.25	<i>0.80</i>			
<b>BAO</b>	<b>0.83</b>	0.11	0.12	0.18	0.63	<i>0.93</i>		
<b>FRES</b>	<b>0.90</b>	0.06	0.06	0.06	0.08	0.04	<i>0.97</i>	
<b>FLYO</b>	<b>0.78</b>	0.06	0.00	0.00	0.01	0.02	0.15	<i>0.91</i>

(a) The average variance extracted per construct is presented in bold in the second column.

(b) Alpha coefficients are presented in the diagonal and are in italics.

(c) The squared correlations between constructs are presented in the lower triangle.

**Table 5. Test results for the proposed and competitive models**

				Proposed Model				Competitive Model			
				Standar d param eter	$\sigma$	t-test	p-value	Stand. par.	$\sigma$	t-test	p-value
<b>Perceived e-personalisation and online customer experience</b>											
<b>H1</b>	Perceived design e-personalisation	→	Ease of use	0.46	0.101	4.605	0.000	0.50	0.148	3.403	0.000
	Perceived design e-personalisation	→	Pleasure of use	-	-	-	-	0.01	0.178	0.070	0.944
<b>H2</b>	Ease of use	→	Pleasure of use	0.81	0.064	12.298	0.000	0.82	0.208	3.869	0.000
	Pleasure of use	→	Ease of use	-	-	-	-	-0.09	0.254	-0.375	0.707
<b>Online customer experience and intentions</b>											
<b>H3</b>	Pleasure of use	→	Intention to reuse	0.48	0.130	4.997	0.000	0.39	0.216	2.433	0.015
	Ease of use	→	Intention to reuse	-	-	-	-	0.11	0.213	0.696	0.486
<b>H4</b>	Intention to reuse	→	Positive word of mouth	0.80	0.092	7.235	0.000	0.80	0.091	7.252	0.000
<b>Covariates</b>											
	Familiarity with online hotel booking	→	Ease of use	-0.01	0.040	-0.226	0.821	-0.01	0.043	-0.172	0.863
	Familiarity with online surfing	→	Ease of use	0.26	0.098	2.844	0.004	0.29	0.115	2.498	0.012
	Task involvement	→	Ease of use	-0.01	0.045	-0.133	0.894	-0.00	0.049	-0.034	0.973
	Self-efficacy	→	Ease of use	0.25	0.005	3.608	0.000	0.27	0.007	3.101	0.002
	Familiarity with online hotel booking	→	Intention to reuse	0.14	0.082	1.387	0.165	0.13	0.082	1.319	0.187
	Familiarity with the city of Lyon	→	Intention to reuse	0.06	0.086	0.581	0.561	0.06	0.086	0.583	0.560
<b>Goodness of fit measures</b>											
	<b>Chi<sup>2</sup> / df</b>					300.9 / 208 (1.447)				299.9 / 205 (1.463)	
	<b>RMSEA</b>					0.062				0.063	
	<b>TLI</b>					0.959				0.957	
	<b>CFI</b>					0.966				0.966	
	<b>SRMR</b>					0.068				0.065	

**Table 6. Indirect effects table**

<b>Indirect effects</b>		<b>Standard parameter</b>	<b>Lower CI</b>	<b>Upper CI</b>	<b>p-value</b>
Perceived e-personalisation →	Pleasure of use	0.37	0.23	0.59	<i>0.005</i>
	Intention to reuse	0.18	0.10	0.32	<i>0.002</i>
	Positive word of mouth	0.14	0.08	0.26	<i>0.003</i>
Ease of use →	Intention to reuse	0.39	0.28	0.51	<i>0.006</i>
	Positive word of mouth	0.31	0.20	0.43	<i>0.010</i>
Pleasure of use →	Positive word of mouth	0.38	0.26	0.53	<i>0.010</i>

CI = Confidence interval

## Appendix A. Illustration of personalised adaptations of the hotel's website (page 'Rooms and suites') based on declared disabilities

Declared disabilities	Illustrations of the website interface design adaptations
Poor visual acuity	
Poor computer skills	

## Poor concentration skills

L'Hôtel R  
HOTEL - LYON

ACCUEIL CHAMBRES & SUITES RESTAURANT & BAR PETIT DÉJEUNER SERVICES LOCALISATION



### CHAMBRES & SUITES DU ROYAL LYON

L'Hôtel Le Royal Lyon vous offre 72 chambres dont 10 Junior suites.

Nous vous accueillons dans le confort, l'élégance et le charme avec un décor simple, moderne et épuré. La couleur blanche associée au bleu ou au rouge des tissus donne une immédiate impression de confort et de tranquillité.

- Présentation
- Classique simple
- Classique double
- Supérieure côté cour
- Supérieure vue Lyon
- Junior suite Rotonde
- Junior suite Bellecour

#### Classique simple



15m<sup>2</sup> - Chambre avec un lit pour une personne et balconnet vue place Antonin Poncet...

En savoir plus

Réserver

#### Classique double



18m<sup>2</sup> - Chambre un lit double avec vue sur la place Bellecour ou place Antonin poncet...

En savoir plus

Réserver

#### Supérieure côté cour



25m<sup>2</sup> - Chambre avec un lit double sur cour...

En savoir plus

Réserver

#### Supérieure vue Lyon



30m<sup>2</sup> - Une chambre avec vue sur la place Bellecour ou la place Antonin Poncet...

En savoir plus

Réserver

#### Junior suite rotonde



40m<sup>2</sup> - Chambre rotonde avec un lit King size. Unique à Lyon...

En savoir plus

Réserver

#### Junior suite Bellecour



40 m<sup>2</sup> - La seule Junior suite à Lyon avec vue sur la place Bellecour...

En savoir plus

Réserver

- Only Lyon
- Mentions légales
- Contactez-nous
- Notre blog



## Poor ability to read written information

L'Hôtel R  
HOTEL - LYON

ACCUEIL CHAMBRES & SUITES RESTAURANT & BAR PETIT DÉJEUNER SERVICES LOCALISATION



### CHAMBRES & SUITES DU ROYAL LYON

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- Présentation
- Classique simple
- Classique double
- Supérieure côté cour
- Supérieure vue Lyon
- Junior suite Rotonde
- Junior suite Bellecour

#### Classique simple

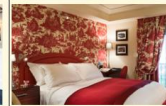


15m<sup>2</sup> - Chambre avec un lit pour une personne et balconnet vue place Antonin Poncet...

En savoir plus

Réserver

#### Classique double



18m<sup>2</sup> - Chambre un lit double avec vue sur la place Bellecour ou place Antonin poncet...

En savoir plus

Réserver

#### Supérieure côté cour



25m<sup>2</sup> - Chambre avec un lit double sur cour...

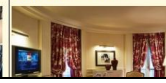
En savoir plus

Réserver

#### Supérieure vue Lyon



#### Junior suite rotonde



#### Junior suite Bellecour



High level of  
dyslexia

46




## Age-related difficulties for those over 56

47



Low levels  
reported for all  
characteristics



HOTEL · LYON

 ACCUEIL

 **CHAMBRES  
& SUITES**

 RESTAURANT  
& BAR

 PETIT  
DÉJEUNER

 SER

CHAMBRES & SUITES DU ROYAL  
LYON

L'Hôtel Le Royal Lyon vous offre 72 chambres  
dont 10 Junior suites.

1. **Présentation**

2. **Classique simple**

3. **Classique double**

4. **Supérieure côté cour**

5. **Supérieure vue Lyon**

6. **Junior suite Rotonde**

7. **Junior suite Bellecour**

Classique simple



15m<sup>2</sup> - Chambre  
avec un lit  
pour une  
personne et  
balconnet vue  
place Antonin  
Poncet...

**En savoir plus**

Classique double



18m<sup>2</sup> - Chambre  
un lit double  
avec vue sur la  
place Bellecour  
ou place Antonin  
poncet...

**En savoir plus**

48

## Appendix B. Details of the four tasks

### Details of the four tasks to be completed on the hotel website

**Task 1/4: After researching the Hotel R website, indicate the name of the subway stop that is the closest to the hotel.**

*Tick your answer on the list of choices provided.*

TERREAUX stop (1)

BELLECOUR stop (2)

VIEUX-LYON stop (3)

MASSENA stop (4)

**Task 2/4: After researching the Hotel R website, indicate the breakfast hours during the week.**

*Tick your answer on the list of choices proposed.*

From 05:00 to 09:00 (1)

From 06:00 to 10:00 (2)

From 06:30 to 10:30 (3)

From 07:00 to 11:00 (4)

**Task 3/4: After researching the Hotel R website, indicate whether the room Junior Suite Rotonde is accessible for people with reduced mobility (PRM).**

*Tick your answer from the list of choices provided.*

The Junior Suite Rotonde is not accessible to PRM. (1)

The Junior Suite Rotonde will soon be accessible to PRM. (2)

The Junior Suite Rotonde is accessible to PRM. (3)

**Task 4/4: After researching the Hotel R website, indicate the internet accessibility by Wi-Fi connection.**

*Tick your answer among the list of choices proposed.*

Internet by Wi-Fi connection is not accessible in the hotel. (1)

Internet by Wi-Fi connection is accessible only in the rooms. (2)

Internet by Wi-Fi connection is only accessible in the common areas. (3)

Internet by Wi-Fi connection is accessible in the rooms and the common areas. (4)

Note: It was specified on each page: 'Enter your answer in the questionnaire, then return to the website. Please do not close the hotel website'. The order of the precoded answers was random.

## Appendix C. Means, standard deviations and correlation matrix

	m	$\sigma$	PERSO1	PERSO2	PERSO3	USA1	USA2	USA3	PLA1	PLA2	PLA3	INT1	INT2	BAO1	BAO2	BAO3	FNAV	FRES1	FRES2	FRES3	FLYO1	FLYO2	FLYO3	IMPL
PERSO1	5.40	1.17																						
PERSO2	5.05	1.28	0.696																					
PERSO3	5.11	1.17	0.801	0.709																				
USA1	5.77	1.17	0.674	0.525	0.616																			
USA2	5.71	1.23	0.645	0.539	0.596	0.868																		
USA3	5.84	1.11	0.714	0.525	0.647	0.884	0.857																	
PLA1	5.62	1.11	0.582	0.505	0.553	0.728	0.656	0.716																
PLA2	5.59	1.15	0.543	0.460	0.509	0.733	0.660	0.684	0.933															
PLA3	5.68	1.12	0.619	0.490	0.552	0.780	0.733	0.802	0.929	0.900														
INT1	3.41	1.78	0.327	0.473	0.325	0.378	0.366	0.348	0.375	0.426	0.361													
INT2	2.64	1.76	0.255	0.347	0.258	0.361	0.360	0.347	0.414	0.447	0.383	0.669												
BAO1	4.44	1.57	0.329	0.330	0.374	0.380	0.290	0.386	0.446	0.485	0.404	0.517	0.484											
BAO2	4.09	1.65	.267	0.291	0.313	0.352	0.256	0.309	0.382	0.446	0.339	0.650	0.600	0.740										
BAO3	4.22	1.66	.265	0.308	0.310	0.346	0.263	0.308	0.391	0.465	0.349	0.649	0.636	0.767	0.951									
FNAV	5.74	1.05	.697	0.516	0.597	0.656	0.644	0.668	0.525	0.502	0.601	0.280	0.222	0.316	0.303	0.280								
FRES1	3.77	1.85	.282	0.195	0.166	0.214	0.182	0.266	0.238	0.182	0.268	0.236	0.185	0.136	0.208	0.165	0.405							
FRES2	3.62	1.75	.262	0.169	0.155	0.221	0.179	0.290	0.231	0.170	0.276	0.242	0.198	0.131	0.219	0.187	0.374	0.910						
FRES3	3.58	1.83	.253	0.163	0.106	0.200	0.148	0.220	0.240	0.185	0.250	0.249	0.217	0.155	0.248	0.212	0.349	0.909	0.896					
FLYO1	2.70	1.80	.176	0.115	0.138	-0.058	-0.001	0.023	0.008	-0.035	0.017	0.025	0.031	0.114	0.036	0.060	0.235	0.320	0.329	0.302				
FLYO2	2.61	1.74	.283	0.128	0.183	0.014	0.063	0.100	0.057	0.044	0.091	0.083	0.091	0.112	0.149	0.150	0.282	0.360	0.375	0.346	0.893			
FLYO3	2.41	1.62	.217	0.226	0.132	0.096	0.099	0.113	0.120	0.119	0.134	0.317	0.383	0.238	0.308	0.324	0.281	0.349	0.389	0.397	0.705	0.717		
IMPL	5.38	1.51	.146	0.147	0.109	0.206	0.153	0.165	0.215	0.236	0.189	0.303	0.294	0.246	0.356	0.346	0.259	0.262	0.251	0.277	-0.021	0.042	0.086	
EFF	85.91	14.08	.499	0.336	0.425	0.583	0.529	0.551	0.502	0.527	0.504	0.199	0.133	0.317	0.246	0.253	0.454	0.152	0.170	0.154	-0.149	-0.055	-0.034	0.286

## Appendix D. Scale items and measurement model test

	$\lambda$ standard	$\sigma$	t-test	p
<b>Perceived e-personalisation of the web interface (PERSO) (a)</b>				
PERSO1. This website corresponds to my personal needs in terms of navigation	0.92	-	-	-
PERSO2. This website considers my personal difficulties in terms of navigation.	0.77	0.078	10.66	0.000
PERSO3. This website offers a navigation adapted to my personal situation.	0.87	0.071	13.45	0.000
<b>Ease of use (USA) (a)</b>				
USA1. This website allows you to quickly find what you are looking for.	0.95	-	-	-
USA2. This website does not require special efforts to access information.	0.91	0.056	18.15	0.000
USA3. This website offers easy navigation.	0.94	0.047	20.28	0.000
<b>Pleasure of use (PLA) (a)</b>				
PLA1. I find this website nice to use.	0.97	-	-	-
PLA2. I find this website pleasant to use.	0.95	0.039	26.15	0.000
PLA3. I find this website satisfactory to use.	0.95	0.037	26.47	0.000
<b>Intention to reuse (INT) (a)</b>				
INT1. I intend to go to this website.	0.84	-	-	-
INT2. I will ask to receive commercial offers from this website.	0.80	0.107	8.88	0.000
<b>Positive word of mouth (BAO) (a)</b>				
BAO1. I intend to say positive things about this hotel.	0.77	-	-	-
BAO2. I intend to recommend this hotel to my family and friends.	0.96	0.105	12.30	0.000
BAO3. I intend to speak highly of this hotel to my family and friends.	0.99	0.107	12.65	0.000
<b>Familiarity with online hotel booking (FRES) (a)</b>				
FRES1. I am very familiar with hotel booking websites.	0.96	-	-	-
FRES2. Compared to the rest of the population, I am very familiar with hotel reservation websites.	0.95	0.041	22.95	0.000
FRES3. I consult many hotel reservation websites.	0.94	0.043	22.70	0.000
<b>Familiarity with the city of Lyon (FLYO) (a)</b>				
FLYO1. I am very familiar with the city of Lyon.	0.93	-	-	-
FLYO2. Compared to the rest of the population, I know a lot about Lyon.	0.96	0.058	17.18	0.000
FLYO3. I consult a lot of information about Lyon.	0.75	0.068	10.78	0.000
<b>Familiarity with online surfing (FNAV) (a)</b>				
FNAV. I feel familiar with online navigation.	-	-	-	-
<b>Task involvement (IMPL) (b)(c)</b>				
IMPL. When using the website you visited, you were: Please indicate your opinion for each of the following positive/negative combinations. Not at all involved / Very involved	-	-	-	-
<b>Self-efficacy (EFF) (c)</b>				
EFF. The probability that you will find the information you are looking for on this website is: Indicate your opinion by moving the slider (0%–100%)	-	-	-	-

**Goodness of fit of the measurement model:**  $\chi^2/149 = 1.63$ ; RMSEA = 0.068; TLI = 0.954; CFI = 0.964; SRMR = 0.059.

(a) Seven-point scale ranging from 'Strongly disagree' to 'Strongly agree'.

(b) Seven-point bipolar semantic differential scales.

(c) No results are shown because the scale only has one item.