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# Are my symptoms serious Dr Google? A resource-based typology of value co-destruction in online self-diagnosis



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#### ABSTRACT

Online self-diagnosis, where consumers engage with technology by applying their knowledge and skills to generate a medical diagnosis without the participation of a health care professional, is commonplace. Although co-creation of value for consumers and e-health service providers (i.e., suppliers of technological interfaces for consumers to self-diagnose) can occur via "do-it-yourself" diagnosis, we argue that it also has strong potential for value co-destruction. This is because of deficiencies in or misuse of resources (consumer or e-health provider). Based on a review of the service science, information systems and health care literatures, we develop a typology of value co-destruction in online self-diagnosis. It shows that online self-diagnosis can result in value co-destruction of consumers' service process and outcome when consumer resources are deficient or misused (e.g., knowledge) or when e-health provider resources are lacking (e.g., poor quality offerings). The value co-destruction perspective has not been examined previously in this context and is important because it can negatively affect consumers' well-being. A consumer and service focus is missing from research on online self-diagnosis, which our typology addresses. Implications of our typology for providing online health information and more specialised self-diagnosis services are discussed, drawing on a multi-pronged, multi-stakeholder approach, along with future research opportunities.

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#### CHINESE ABSTRACT

网络自我诊断,即消费者通过自己掌握的知识和技能,在没有专业医务人员的参与情况下,利用技术手段来获取 医疗诊断,这种做法相当普遍。尽管消费者与电子医疗服务提供商(即为消费者自我诊断提供技术界面的供应商) 之间的参与协作可通过"自助式"诊断而实现,但我们认为这种方式极有可能造成价值共毁。这是由于资源不足或资源使用不当而造成的。通过对服务科学、信息系统和医疗保健等文献的检索,我们得出了网络自我诊断中价值共毁的类型模式。研究表明,如果消费者的资源不足或资源使用不当(如相关知识)或者电子医疗提供商的资源 匮乏(如资源的质量不佳),网络自我诊断可导致消费者服务流程和疗效的价值共毁。文献中尚未有对价值共毁的研究,因此很有必要对其进行探讨,因为它可给消费者的福祉带来负面影响。通过借鉴多利益方的多方参与方法,本文阐述了我们的类型模式在网络医疗信息提供和更专业化的自我诊断服务中的指导意义,此外,还指出了未来的研究方向。

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#### 1. Introduction

Self-diagnosis of health conditions has been around for many years, but has proliferated due to consumers' increased access to information via the Internet and mobile technologies (Avery et al., 2012; Yan and Sengupta, 2013). Online self-diagnosis refers to consumers engaging with technology by applying their own knowledge and skills to generate medical diagnoses themselves, without the

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participation of a health care professional (Hu and Haake, 2010; Kuehn, 2013). Three out of four Australian consumers admit to having searched the Internet to diagnose medical symptoms (News Limited, 2013). Similarly, six out of 10 consumers from the UK and USA who go online for health information, do so for the purpose of self-diagnosis (Bupa, 2011). However, despite the potential benefits of online self-diagnosis for both consumers and health care professionals, e.g., cost and time saving (Finch et al., 2008; Nijland et al., 2008), the Australian Medical Association has labelled the "doctor in the mouse" trend as "alarming" (News Limited, 2013). Disturbingly, one in five Australian consumers admit to misdiagnosing themselves after relying on online health advice, including



I'M GLAD YOU TOOK THE TROUBLE TO DIAGNOSE YOUR OWN SYMPTOMS USING THE INTERNET...AND YOU'D BE 100% ACCURATE...IF YOU WERE A GOAT!

**Fig. 1.** Online self-diagnosis cartoon. http://www.cartoonstock.com/directory/h/hypochondriacal.asp.

under- and over-diagnosing symptoms (News Limited, 2013) (Fig. 1). Various popular press headlines, such as "Dodgy online self-diagnoses: a risk to health" and "What's that symptom? Experts warn of self-diagnosis via the Web," hence echo concern over this common consumer practice. Online self-diagnosis can negatively influence consumer health and well-being, thus creating adverse public health impacts.

The purpose of this paper is to explore value co-destruction associated with online self-diagnosis. We review the literature in the domains of service science, information systems, and health care in order to develop a resource-based typology of value co-destruction for online self-diagnosis. We argue that the inappropriate use of online self-diagnosis tools can result in value co-destruction (Echeverri et al., 2012; Plé and Cáceres, 2010; Smith, 2013), which is the opposite of value co-creation within Vargo and Lusch's (2004) service dominant (S-D) logic. Rather than service systems (e.g., consumers and organisations) integrating resources, such as skills and knowledge, in a mutually beneficial way (Vargo and Lusch, 2004), resources are misused, either accidentally or intentionally, resulting in diminished well-being for one or more service systems (Plé and Cáceres, 2010). Resources are inappropriately used or used in an unexpected manner. We argue that this can lead to value codestruction in terms of both the service process (i.e., a "breakdown" in the self-diagnosis encounter) and/or the service outcome (i.e., an inaccurate diagnosis resulting in ineffectual treatment or diminished consumer health outcomes), as experienced by consumers. We consider the consumer resources required to effectively undertake self-diagnosis, along with the resources afforded by the e-health service provider (i.e., supplier of the technological interface that enables consumers to self-diagnose).

Value co-destruction in online self-diagnosis for consumers is illustrated via the following example:

Mr. K became unwell with constant right-sided loin pain, at times radiating to the groin, and dark coloured urine. He attempted self-diagnosis via an Internet search, deciding renal calculi were the most likely diagnosis, and subsequently self-treated by taking a readily available over-the-counter medication. His symptoms did not improve and after 10 days he consulted his family physician, suggesting the diagnosis of renal calculi during the consultation. The doctor agreed, changing his medication. Mr.

K's condition worsened and after two weeks he presented to the emergency department where he was diagnosed with missed appendicitis with perforation. The delay in diagnosis was a likely contributing factor in perforation and abscess (adapted from Avery et al., 2012).

As this example demonstrates, online self-diagnosis can easily lead to consumers misdiagnosing themselves and adopting treatments that are inappropriate, wasting money and unnecessarily worrying about illnesses that they do not have, rather than seeking advice from a qualified health care professional (Bupa, 2011). Thus, "do-it-yourself" online (mis)diagnosis can be dangerous and possibly even fatal. This example also shows that misinformed health consumers can unduly influence health care professionals' diagnoses (Avery et al., 2012). Thus, increased consumer access to self-diagnosis tools creates a double-edged sword for consumer well-being.

Our paper is structured as follows. Firstly, we review the literature pertaining to online self-diagnosis as an e-health encounter, and then we proceed to discuss its reliance on resource integration for "success", as advanced by S-D logic. Based on our review, we identify the consumer and e-health service provider resources required for effective online self-diagnosis, which if deficient and/ or misused, can result in process and/or outcome value codestruction. The next section then presents our resource-based typology of value co-destruction generated from our literature review. We then outline the theoretical contributions of our typology. Following this, we advance a multi-pronged, multi-stakeholder approach to its practical (including policy) implications to minimise or eliminate value co-destruction from online self-diagnosis. While it may be possible to directly address some of the consumer and e-health provider deficiencies that we highlight within our typology, the participation of intermediaries, such as health care professionals, regulators and industry bodies or non-government organisations (NGOs) may also be required to generate holistic solutions. Finally, directions for future research on this phenomenon are offered.

#### 2. Literature review

#### 2.1. Online self-diagnosis as a form of e-health service encounter

Arguably, health care is the most personal and important service that consumers buy (Berry and Bendapudi, 2007). Lanseng and Andreassen (2007) note that there are several differences between health care services and other consumer services. Firstly, health care is typically sought by consumers who are ill and stressed, which can cause consumers to be more vulnerable than they would normally be (Berry and Bendapudi, 2007). Secondly, health care is a more intimate service targeted at consumers' minds and/or bodies. so that consumers are more actively involved in health care via the provision of their resources, such as their time and effort (Lowrey and Anderson, 2006). For example, health consumers need to participate by seeking medical advice in a timely fashion and then by adhering to their prescribed treatment as directed by their health care provider in order to get well. Thirdly, health care service is high in credence properties and information asymmetry. It is a complex and uncertain service (Hamid and Sarmad, 2008), where the health care provider making a diagnosis generally has much greater knowledge and ability to distil relevant and reliable information than consumers. Health care services are, therefore, difficult for consumers to evaluate during their provision, as an improvement in consumers' health may only be determined in the future, e.g., the success of an operation may only be known days, weeks or even months after it has occurred. As such, health care is typically as-

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