

Original Paper

Veterinarians' Perceptions of Online Services

Karland King¹, Clemens Bechter^{2*} & Siriluck Rotchanakitumnuai²

¹ Euro MBA, Maastricht, The Netherlands

² Thammasat Business School, Tha Prachan, Bangkok, Thailand

* Clemens Bechter, Thammasat Business School, Tha Prachan, Bangkok, Thailand

Received: May 15, 2018

Accepted: May 28, 2018

Online Published: June 8, 2018

doi:10.22158/rem.v3n3p174

URL: <http://dx.doi.org/10.22158/rem.v3n3p174>

Abstract

The purpose of the study is to evaluate the perceived usefulness of online materials from a veterinarian's perspective. The authors used an online questionnaire that was posted on the homepage of a Veterinarian News site. Questions were based on previous publications and added contemporary services such as remote pet monitoring by means of wearable electronic devices. According to our study, the perceived usefulness of online services can be condensed into four major dimensions: 1) Authoritative Knowledge & Updates; 2) Practical Online Content delivered by webportals; 3) Remote Monitoring/Tracking of pets; 4) Health Coaching. The findings have implications for the cooperation between suppliers and veterinarians. One size does not fit all. Veterinarians want to use digital media for receiving competent personalized advice in order to sell it on to their customers. Suppliers will have to provide unbiased advice to compete for veterinarian's heart share instead of simple market share.

Keywords

animal health, veterinarians, digital services, webinar

1. Introduction

The concept of service quality has been studied for a long time, particularly the SERVQUAL model by Parasuraman et al. that assessed the attitude of users toward the service quality of human service providers. There are ten factors determining service quality including reliability, responsiveness, competence, access, courtesy, communication, credibility, security, tangibles, and customer understanding. Grönroos differentiated service quality into two main factors: functional and technical quality. The Internet has been used to provide customers with services starting from creation of an organization's website to give information and services to customers through the website to the formation of an organization's social networks to communicate with customers and members of the network. Service quality evaluations have been applied to online services in form of checklist-like frameworks

such as the E-S-QUAL, the SITEQUAL and the e-SQ model. Some authors studied only certain aspects of service quality such as the quality of information. Other authors focused only on technology. Rotchanakitumnuai included quality features through the whole process of electronic service including website design, service design, technology, and customer service quality. Babu and Subramoniam conducted a study on the quality of e-tourism through websites based on the ten SERVQUAL elements including reliability, access, responsiveness, ease of use, security, tangibles, trust, personalization, credibility, and empathy; in their opinion a website should incorporate some type of recommender system for mass-customization.

Hadwich et al. conducted a study on the service quality of e-health including accessibility, competence, information, usability/user friendliness, security, system integration, trust, individualization, empathy, ethical conduct, degree of performance, reliability, and ability to respond. Another study focused on hospital websites and found that websites must provide quality information and have to interact effectively as communication mediums for service transaction and support to their patients and other related stakeholders such as citizens, health-care professionals and local communities.

Services provided for Animal Health-Care Professionals (AHCP) is lacking behind Human e-health. Digital services in Human e-health are estimated to lagging 3-4 years behind other service industries. A time lag of 5-6 years for animal health seems realistic.

IMS Health reported that the deployment of digital channels has increased by 30% in 2014 (inclusive of online retailing, emailing and video streaming), with the traditional singular approaches of influence and advertising moving towards a more integrated approach across multiple touch-points and platforms designed for engagement, rather than unidirectional.

Emerging markets such as China and Brazil have seen double digit increases in animal health marketing budgets, however conversely, other major European markets have seen significant cuts; mirroring this, the number of Account Managers has increased in Asia Pacific (APAC) and Latin American Markets at 9.5% and 1.6% respectively, and conversely in European Markets numbers have declined at 4% in recent years. Despite variations in marketing expenditure globally, there is consistent investment across all countries in the digital channels. Klie estimates that 25% of personal interactions with veterinarians (vets) can be replaced by digital media. Dobrow reported that 86% of companies are using digital channels to target Health Care Professionals (HCP), utilizing media such as websites, e-detailing, social media, digital ads and mobile/tablet apps. A survey among 200 executives from pharma, biotechnology, devices and diagnostics companies found that Business-To-Business (B2B) marketing budgets (to HCPs) account for 75% compared to 25% B2C.

Ising and Munie see digital media as the driving force for growth and profitability in the pharmaceutical market. Quantia MD and Capgemini Consulting surveyed over 1,756 physicians, as well as drew upon knowledge from a previous study (with a sample of 630 physicians) and found that the major channels in which physicians prefer to receive information is by: Independent medical websites and communities (61%); Medical & clinical liaisons (42%); and Pharma Rep (40%). This means that medical websites and

communities are perceived as an unbiased source of information. Research by Bain estimates that by the end of 2017, 93% of physicians in the U.S.A. will be using electronic medical records and 97% will have access to electronic treatment protocols.

Touted as the upcoming area of promise, “big data” is set to improve (animal) health care and decrease costs. It is predicted that diseases may be able to be detected earlier, leading to treatment interventions at an earlier stage resulting in more effective outcomes in managing both individual patients and large populations. The types of needed data are high volume, high diversity, biological, clinical, environmental and lifestyle information in relation to health and wellness status. Data may include clinical data from HCPs, imaging, laboratories, pharmacies, insurance companies, machine generated/sensor data, and even social media posts as long as they comply with personal data protection.

Partnering with technology companies may become the next digital wave. For example, Google focuses on early-stage digital health companies. IBM is trying to enter the health-care market with the AI system Watson. Other large technology firms such as Amazon and Apple are also looking to stake their claim in health-care. Digital health technology’s ability to capture health data in the form of wearable devices, mobile health apps (mHealth) and social media is changing the way we see health. Increasing patient engagement and interaction may become the norm. Smart wearing sensors in the area of preventative medicine such as cardiopulmonary, vascular, endocrine, neurological function and rehabilitation medicine are both accurate, effective and reliable. This provides a potential area of development for augmenting HCP and patient relationship, increasing user engagement and responsibility for their own health-care, as well disrupting the model of health-care management and spending. Long-term a drug should be accompanied by services such as disease awareness, education and preventative health-care to increase its value.

Recio et al. counted over 165,000 apps available in health and medicine across digital platforms, being in the top three of the fastest growing categories (after games and utilities). However, a systematic review carried out by Mosa et al. of 83 health-care applications for smart-phones directed at physicians, medical and nursing students revealed that those deemed most useful are indicated for disease diagnosis, drug referencing and used for calculating medicine doses (medical calculator applications). It seems that patients are more willing to use health-care applications than physicians.

In research conducted by CM Research surveying over 2,819 veterinarians from 10 European countries and the USA, it was found that the average uptake of veterinary applications is low; only 30% of veterinarians are making use of them. The ones who use apps work with 2.5 veterinary apps on average with younger veterinarians more likely to use them. In the UK, the most frequently used applications include BSAVA formulary, and the Chocolate Toxicity app. For those respondents that didn’t use veterinary applications, the main reasons cited for not using them included being time consuming (eating into already short consult times, having to research which apps are useful and finding them), putting clients off (in checking the application in the consult room), and having to familiarize oneself with using them.

Increasingly pet owners are turning to the internet to research information about their animals. Kogan et al. found of those that use the internet, 13.4% use it to search for pet health information on a weekly basis, and a further 24.2% using it on a monthly basis. Reasons cited for the most frequent use relating to pet health information searches include: curiosity (47.4%) and the desire to clarify information received by their veterinarian (33.6%), though it was considered as a complement to their veterinarian's advice rather than to replace it.

2. Materials and Methods

Online services can support veterinarians in many ways such as recommender system, medical calculations, information on websites, interactive webinars, etc. The literature review has shown that the uptake of such online support is relatively low. Pharmaceutical companies offer online services (e.g., e-detailing, webinars) to support veterinarians but it is the perceived usefulness that determines the usage of such support. Figure 1 shows the research framework.

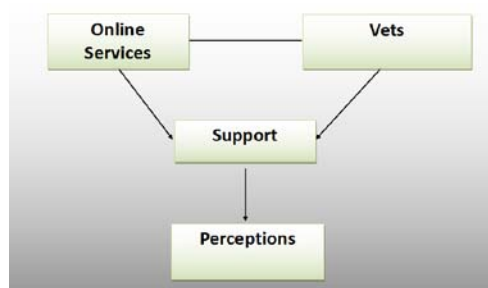


Figure 1. Research Framework

The research objectives were:

- evaluating the perceived importance of available online service
- assessing whether there are demographic differences
- extracting major factors on which veterinarians rate online services

During the first three months of 2017 an online survey was posted on the homepage of a veterinary news site. Overall 93 responses were received. The demographics of the sample show that most responses came from Anglo-Saxon countries, see Table 1.

Table 1. Sample Demographics by Country

Country	Frequency	Percent
Australia	28	30.1
Canada	3	3.2
Denmark	2	2.2

Ethiopia	1	1.1
HongKong	5	5.4
Ireland	2	2.2
New Zealand	1	1.1
Singapore	2	2.2
UK	34	36.6
Sweden	1	1.1
USA	14	15.1
Total	93	100.0

Most veterinarians were between 20 and 60 years old, see Table 2.

Table 2. Same Demographics by Age Range

Age	Frequency	Percent
20-40 yrs	62	66.7
40-60 yrs	29	31.2
60+yrs	2	2.2
Total	93	100.0

The questionnaire covered 16 items. Ranking was in form of a Likert scale from 1 (totally unimportant/fully disagree) to 5 (very important/fully agree).

3. Results

3.1 Ranking of Digital Services

Table 3 lists the importance of services as perceived by the veterinarians.

Table 3. Importance of Services

Service	N	Mean	Std. Deviation
Webinars	93	4.23	.662
Updates via Email	93	4.05	.826
Support	93	4.00	.847
Vet Portal	91	3.92	.778
Local Community	92	3.88	.709

Remote Monitoring	93	3.85	.977
Website	93	3.75	.963
Case Study	93	3.74	.859
Content	93	3.62	.943
Supplementary mat	93	3.49	.951
Fitness Tracker	93	3.46	.984
Online discussions	92	3.46	.954
Videos	93	3.45	1.027
Marketing Strategy	93	3.11	.983
Virtual Reality	93	3.03	1.005
Email and SMS	93	2.97	1.037

Highest ranked service was webinar. The corresponding statement was “I would find a 20-30 minute webinar run by a specialist in a disease/therapy area followed immediately afterwards by an interactive 20-30 minute online discussion forum to ask questions useful”. Important to understand that such webinar is hosted by a specialist and must not being sales pitch. Second most important service is Update. The statement reads as follows “I am interested in receiving communications about the latest updates in a disease/therapy area in the form of technical newsletters delivered via email on a fortnightly or monthly basis”. Again, it shows the need for competent and objective information that helps the veterinarian in his/her daily work.

Findings are in line with Huntley et al. who surveyed 6,310 veterinarians and found that most prefer seminars (49.7%) followed by conferences (23.4%), and online courses (8.7%) as support functions. Since our survey looked only into digital media it is unsurprising that the digital form of a seminar, the webinar, ranked highest.

We will discuss the other items later in the context of a Factor Analysis.

3.2 Group Differences

Above Table 3 lists the overall scores. However, there might be group differences such as different opinions according to age group, country or type of practice (equine, mixed, companion animal, etc.). To determine whether a difference was significant a t-Test was conducted. It assumes (null-hypothesis) that means are equal, i.e., if this hypothesis can be rejected the means are different. We used 0.05 as rejection level. We could not find any difference according to country or age group. The only significant (0.01) difference was between Companion Animal (CA) veterinarians and other practice types in the sense that they rank receiving updates on diseases/therapies via email with 4.22 (stand dev. 0.44) higher than their non CA peers with 3.76 (stand dev. 0.89). Apart from this single difference we can conclude that

veterinarians seem to be a rather homogeneous group of people in regard to their online service expectations.

3.3 Factor Analysis

Factor Analysis is a data reduction method. It condenses many variables, in our case the 16 questions, into major underlying factors. In our analysis we used Principal Component Analysis followed by Varimax Rotation with Kaiser Normalization. The 16 questions resulted in 6 Factors (Dimensions), see Table 4. Not all factors carry the same weight. Factor 1 can explain 14.4% of total variance and is therefore the most important one. A factor loading is nothing else than the correlation between the question and the factor, e.g., Video_Comms correlates with factor 1 with 0.708. We regarded any loading close to 0.7 or higher as high and therefore worth interpreting.

Table 4. Factor Analysis

Question	Factor/Dimension					
	Updates (14.4%)	Web Portal (12.7%)	Hardware (11.1%)	Support (10.7%)	Email/SMS (8.6%)	Planning (8.0%)
Video_Comms	.708	-.014	.256	.212	.033	.152
Web_Dscn	.698	.124	-.237	.119	-.085	-.043
Disc_Frms	.687	.182	.377	-.072	-.022	-.078
Email_Comms	.485	-.194	.136	-.019	.161	.357
Virt_SR	.400	.244	.179	.226	.353	-.381
Info_Presc2	.118	.850	.121	.125	.038	-.040
PH_Portal	.024	.797	.060	.206	.010	.153
Info_Presc	.030	.611	.474	-.106	.197	-.064
Fit_Track	.091	.192	.815	.067	-.104	.005
Remo_Mon	.156	.095	.720	.455	.104	-.033
Supp_Prog	-.037	.101	.172	.840	-.075	-.005
Mark_Eng	.185	.101	.038	.671	-.007	-.053
Elec_Comms	-.220	.050	-.017	-.130	.852	-.097
Case_Stdy	.342	.078	-.018	.047	.638	.308
Mark_Strat	.152	.198	-.062	.029	.020	.750
Cont_SocM	.428	.218	-.089	.381	-.065	-.538

Factor 1 can be described as the “objective News Updates” Dimensions. The three high loading statements are:

“I am interested in receiving communications about the latest updates in a disease/therapy area in the form of 5-10 minute videos on a fortnightly or monthly basis”.

“I would find a 20-30 minute webinar run by a specialist in a disease/therapy area followed immediately afterwards by an interactive 20-30 minute online discussion forum to ask questions useful”.

“I would be interested in engaging in an ongoing online discussion forum for veterinary professionals in a disease/therapy area facilitated by key opinion leaders (sponsored by an Animal Health Product Supplier)”.

Factor 2 can be called the “web portal dimensions”.

The statements were:

“Pet owners cite the internet as the third most common place they look for information about their pet. Often the information found can be misleading. In a recent study conducted, 93% of pet owners reported that receiving a website recommendation (also known as an information prescription) from their veterinarian at the time of a consult was an excellent idea and 83.5% felt it added to the advice of their veterinarian after attending the appointment. In knowing this, where I know of a credible website, I will give pet owners a website recommendation (information prescription) for the majority of my consults and integrate it as part of my consultation routine”.

“Having a reliable general pet health information portal, e.g., a website, which I can direct my clients to about the benefits of preventative health-care, that is accredited with respected industry bodies like the British Veterinary Association or British Small Animal Veterinary Association is important to me”.

Factor 3 can be called the “Hardware dimensions”.

Supported Statements:

“I think that wearable fitness trackers (monitoring heart rate, respiratory rate, temperature, and activity levels to name a few) for pets has great potential to be used as a supplement in monitoring health conditions”.

“I would be interested in remote monitoring of my patients with specific chronic conditions and being fed back real time data. For example, having an application that allows the client to monitor a diabetic patient remotely, with information being transmitted electronically back to me so that I can check on his/her progress, e.g., Blood glucose spot checks being performed at home by the owner, with weight, water intake, food intake, insulin dose given, being recorded”. Factor 4 can be called the “health coach”.

Supported Statements:

Once a patient is diagnosed with a chronic condition and started on medication, I feel that ongoing advice, support and emotional counseling in the form of a “health coach” is important in the initial starting phases to help a client through these unsettling times. Trained human nurses have been used with great success in such programs, for example, in the area of diabetes. In veterinary medicine, a trained diabetic nurse adviser could help guide a pet owner once their pet has been diagnosed on things such as how to

give injections and signs to look out for when too much insulin is given. I believe that patient support programs run by veterinary technicians and nurses through regular in clinic consults, and/or via the telephone or virtual calls (e.g., Skype) would help in improving patient health outcomes.

“Marketing what the practice does and engaging with the local community is important to me”.

Factor 5 and 6 have one high loading statement each. For factor 5 it is:

“I would prefer only electronic communications only, e.g., emails or SMS”

For factor 6:

“The practice I work at have a defined marketing strategy/plan for 2017/2018”.

They are the least important factors.

4. Discussion

Although often under time pressure, veterinarians are eager to continue learning and are looking for independent and authoritative advice. Even a one hour webinar seems acceptable as long as it delivers independent advice and time for peer discussion. Discussions with peers and specialists in real-time can enrich such webinars. There are nine webportals that focus solely on webinars for veterinarians. However, almost all webinars are sponsored by pharmaceutical or related companies. There are non-commercial webinars for students but not for practitioners. The survey results show that lifelong learning expectations of veterinarians are different from university level training. The veterinarian's needs are closely profession related. Therefore, there is a latent demand for truly independent webinars that are hosted by independent specialists. Sponsored webinars cost around US\$ 50 so one can assume that veterinarians are willing to pay at least that amount for a truly independent one.

Animal healthcare suppliers should have authoritative websites with content that the veterinarian can recommend to his/her client. For example, wearable tracking devices was an area that veterinarians are interested in and want to learn more about. Such devices and the accompanying software that analyses the huge amount of data and recommend appropriate next steps is readily available. One can even think of competitions to add an element of gamification to animal health, e.g., rewards for walking a certain distance with a pet.

Health coaches are typically humans such as nurses. The more the area of AI develops the more human like virtual nurses will become. One example is Watson by IBM. The fear that such systems may become so sophisticated that they will replace human veterinarians and nurses seems slightly overblown. AI and its impact on health coaching is an area that veterinarians may want to learn more about.

It will need quality assurance. For webinars and online courses, the E-S-QUAL, the SITEQUAL or the e-SQ model should be applied. Veterinarians can conduct a self-assessment of their competencies. Clients can be asked to fill in the SERVQUAL questionnaire and rate the veterinarian along the dimensions of reliability (providing the promised veterinarian service), assurance (trusting the veterinarian), tangibles (using modern equipment), empathy (offering convenience), and responsiveness

(always being available). Besides formal training there are informal learning sources such as interacting with peers and clients.

There are limitations and scope for further research of our study. Firstly, the sample has an Anglo-Saxon bias. Secondly, the results are limited to online services and exclude face-to-face training. Thirdly, recommendations are based on veterinarian's perceptions and as such they reflect an amalgamation of subjective opinions. Fourthly, the readership of the veterinarian news site where the survey was posted might not represent the veterinarian community at large. Fifthly, we looked at demographic differences such as nationality, age and gender but not at a veterinarian's lifestyle.

Despite these limitations we can conclude that veterinarians are eager to keep up-to-date. Often bombarded with commercial sponsoring they value genuine advice and are willing to invest time for keeping up with latest developments in their therapy area and technology. Our research did not find any age differences, i.e., a more senior veterinarian is as open to learn new things as a younger peer. Probably the area where veterinarians want to update their knowledge the most, apart from updates in their specific disease/therapy area, is technology such as remote tracking devices, big data, and AI.

References

- Appelboom, G., Carnacho, E., Abraham, M. E., Bruce, S. S., Dumont, E. L. P., Zacharia, B. E., ... Connolly Jr, E. S. (2014). Smart wearable body sensors for patient self-assessment and monitoring. *Archives of Public Health*, 72(28). <https://doi.org/10.1186/2049-3258-72-28>
- Auffray, C., Balling, R., Barroso, I., Bencze, L., Benson, M., Bergeron, J., ... Zanetti, G. (2016). Making sense of big data in health research: Towards an EU action plan. *Genome Medicine*, 8(71). <https://doi.org/10.1186/s13073-016-0323-y>
- Babu, S. R., & Subramoniam, S. (2015). Development of a Scale to Measure e-Tourism Service Quality in Kerala. *Journal of IT and Economic Development*, 6(2), 36-59.
- Barnes, S., & Vidgen, R. T. (2003). Measuring Web site quality improvements: A case study of the forum on strategic management knowledge exchange. *Industrial Management & Data Systems*, 103(5), 297-309. <https://doi.org/10.1108/02635570310477352>
- Chase, J. (2015). *Nothing (Im)personal*, Haymarket Media Inc. Retrieved from http://media.mmm-online.com/documents/105/0215_feature_2_nonpersonal_26054.pdf
- Chase, J. (2015). *Overview: Can't, won't, don't stop*. Haymarket Media Inc. Retrieved March 3, 2018, from <http://www.mmm-online.com/features/overview-cant-wont-dont-stop/article/401389/>
- Chow, W. S., & Sheung, C. L. (2008). Social network, social trust and shared goals in organizational knowledge sharing. *Information & Management*, 45, 458-465. <https://doi.org/10.1016/j.im.2008.06.007>
- CM Research. (2015). Veterinarianspanel Survey 2015. Epsom, UK. *CM Research*, 1-77.
- Dobrow, L. (2016). How is pharma shifting its marketing budgets? *Medical marketing and media magazine*, March(2016), 29-34.

- Esichaikul, V., Rermlawan, R., & Bechter, C. (2011). M-Health: A mobile application for monitoring acute respiratory disease. *11th International Conference on Electronic Business*. Bangkok, Thailand.
- Grönroos, C. (1994). From marketing mix to relationship marketing: Towards a paradigm shift in marketing. *Management Decision*, 32, 24-20. <https://doi.org/10.1108/00251749410054774>
- Grosch, B., Gupta, A., Lücke, J., & Völler, S. (2014). *Breaking through the noise: Pharmaceutical multichannel marketing in a digital world*. The Boston Consulting Group. Retrieved February 8, 2018, from https://www.bcgperspectives.com/content/articles/biopharmaceuticals_marketing_breaking_through_noise_pharmaceutical_marketing_digital_world/
- Hadwich, K., Georgi, D., Tuzovic, S., Büttner, J., & Bruhn, M. (2010). Perceived quality of e-health services: A conceptual scale development of e-health service quality based on the C-OAR-SE approach. *International Journal of Pharmaceutical and Healthcare Marketing*, 4(2), 112-136. <https://doi.org/10.1108/17506121011059740>
- Ho, C. I., & Lee, Y. L. (2007). The development of an e-travel service quality scale. *Tourism Management*, 28(6), 1434-1449. <https://doi.org/10.1016/j.tourman.2006.12.002>
- Huntley, S. J., Dean, R. S., & Brennan, M. L. (2017). The Awareness of the International Veterinary Profession of Evidence-Based Veterinary Medicine and Preferred Methods of Training. *Veterinary Sciences*, 4, 15. <https://doi.org/10.3390/vetsci4010015>
- IMS Health. (2015). *Global Pharmaceuticals Marketing Channel Reference*. Retrieved February 10, 2018, from https://www.imshealth.com/files/web/Global/Market%20Insights/IMSH%20GPMCR_2015_GlobalExtract.pdf
- Ising, J., & Munie, K. (2015). All to win? Or all to lose? *Driving digitization in life sciences*, Accenture Life Sciences. Retrieved March 9, 2018, from https://www.accenture.com/t20161109T212159__w_/us-en/_acnmedia/PDF-2/Accenture-Strategy-LifeScience-Digitization.pdf
- Klie, L. (2013). Drug makers are in the midst of a digital revolution. Pharmaceutical firms are sharpening their focus on multichannel marketing and analytics. *Customer Relationship Management Magazine*, July(2013), 22.
- Kogan, L. R., Schoenfeld-Tacher, R., & Viera, A. R. (2012). The internet and health information: Differences in pet owners based on age, gender and education. *Journal of the Medical Library Association*, 100(3), 197-204. <https://doi.org/10.3163/1536-5050.100.3.010>
- Kogan, L. R., Schoenfeld-Tacher, R., Simon, A. A., & Viera, A. R. (2010). The internet and pet health information: Perceptions and behaviours of pet owners and veterinarians. *Journal of Veterinary Medicine*, 8(1).

- Kunst, M., Singh, A., & Shieh, G. (2015). *Getting the dose right: A digital prescription for the pharma industry*. Bain & Company, Inc. Retrieved February 15, 2018, from http://www.bain.com/Images/BAIN_BRIEF_%20Getting_the_dose_right.pdf
- Lee, G. G., & Lin, H. G. (2005). Customer perceptions of e-service quality in online shopping. *International Journal of Retail & Distribution Management*, 33(2), 161-176. <https://doi.org/10.1108/09590550510581485>
- Lu, J., Wang, X., & Xu, Z. (2012). Search on Website e-Service quality of scenic area: The perspective of customer satisfaction and behaviour intention. *International Conference on Information Management, Innovation Management and Industrial Engineering*, 2, Sanya, 205-208.
- Mosa, A. S., Yoo, I., & Sheets, L. (2012). A systematic review of healthcare applications for smartphones. *BMC Medical Informatics and Decision Making*, 12(67). <https://doi.org/10.1186/1472-6947-12-67>
- Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A Conceptual Model of Service Quality and its Implications for Future Research. *Journal of Marketing*, 49(April), 41-50. <https://doi.org/10.2307/1251430>
- Parasuraman, A., Zeithaml, V. A., & Malhotra, A. (2005). ES-QUAL: A Multiple-Item Scale for Assessing Electronic Service Quality. *Journal of Service Research*, 7(3), 213-233. <https://doi.org/10.1177/1094670504271156>
- Patsioura, F., Kitsiou, S., & Markos, A. (2009). Evaluation of Greek Public Hospital websites. *Proceedings of the International Conference on E-business 2009 (ICE-B 2009)*, 223-229.
- Quantia, M. D. (2014). *Capgemini Consulting*. Retrieved March 10, 2018, from https://www.capgemini.com/gb-en/wp-content/uploads/sites/3/2017/07/capgemini-quantia_news_release_final.pdf
- Raghupathi, W., & Raghupathi, V. (2014). Big data analytics in healthcare: Promise and potential. *Health Information Science and Systems*, 2(3). <https://doi.org/10.1186/2047-2501-2-3>
- Ranganathan, C., & Ganapathy, S. (2002). Key dimensions of business-to-consumer web sites. *Information and Management*, 39, 457-465. [https://doi.org/10.1016/S0378-7206\(01\)00112-4](https://doi.org/10.1016/S0378-7206(01)00112-4)
- Recio, G. M., Garcia-Hernandez, L. G., Luque, R. M., & Salas-Morera, L. (2016). The role of interdisciplinary research team in the impact of health apps in health and computer science publications: A systematic review. *Biomedical Engineering Online*, 15(Suppl 1), 577.
- Rotchanakitumnuai, S. (2008). Measuring e-government service value with the E-GOVQUAL-RISK model. *Business Process Management Journal*, 14(5), 724-737. <https://doi.org/10.1108/14637150810903075>
- Shchiglik, C., & Barnes, S. J. (2004). Evaluating website quality in the airline industry. *Journal of Computer Information Systems*, 44(3), 17-25.
- The Economist. (2017). *A digital revolution in health care is speeding up*. Retrieved March 9, 2018, from

<http://www.economist.com/news/business/21717990-telemedicine-predictive-diagnostics-wearable-sensors-and-host-new-apps-will-transform-how?frsc=dg%7Cc>

Yoo, B., & Donthu, N. (2001). Developing a scale to measure the perceived quality of Internet shopping sites (sitequal). *Quarterly Journal of Electronic Commerce*, 2(1), 31-47.

Zeithaml, V. A., Parasuraman, A., & Malhotra, A. (2002). Service quality delivery through Web sites: A critical review of extant knowledge. *Journal of the Academic of Marketing Science*, 30(4), 362-375.
<https://doi.org/10.1177/009207002236911>