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Potentials of Internet of Things for effective public relations activities: Are professionals ready?

Lanre Amodu^{1*}, Oladokun Omojola, Nelson Okorie¹, Babatunde Adeyeye¹ and Evaristus Adesina¹

Abstract: The research explored public relations professionals' views on the potentials of adoption of the Internet of Things (IoT) for their functions. High level of competitiveness in business engendered by globalization and technological advancement has made relationship-building sacrosanct to business survival. The advent of Internet-based communication has increased the sophistication of the target audience of public relations, which requires a matching upgrade of the technological versatility of practitioners. Decisions on customer satisfaction are increasingly based on data and the best sources of data are the customers themselves. Consequently, the IoT offers an unprecedented avenue for data gathering through the "assistance" of customers themselves. This study, therefore, adopted an online survey to evaluate the views of 100 public relations professionals on their need for IoT, and a t-test was used to analyse the data. The findings revealed that independent public relations firms or agencies were more likely to adopt IoT for their activities than in-house departments. It was recommended that public relations professionals should explore actively the benefits of IoT for advanced operations.



Lanre Amodu

ABOUT THE AUTHOR

Dr. Lanre Amodu, Dr. Oladokun Omojola, Nelson Okorie, Babatunde Adeyeye and Evaristus Adesina. The authors are scholars from the Department of Mass Communication, Covenant University, Ota, Nigeria. The focus of the research is how ICT can be engaged at a more advanced level in the public relations profession. There have been several positive developments in recent times in the profession as exemplified by the adoption of Internet related channels for information dissemination and customer engagement. The adoption of the Internet of Things will further enhance the effectiveness of public relations practitioners.

PUBLIC INTEREST STATEMENT

The research was an interesting exploration of the potentials of the Internet of Things (IoT) for public relations activities. In the literature review section, the paper presented a summary of the use of the Internet in public relations practice, and the origin and use of IoT generally. We also examined the adoption of IoT for public relations activities, which was termed Smart-PR or Internet Relations of Things. The benefits accruable from Smart-PR included access to direct customer-data, a combination of multiple-source data for better decision-making, prediction of customers' needs, and multi-channel communication with customers. An online survey of 100 public relations professionals in Nigeria and a t-test analysis revealed that independent public relations professionals were more likely to engage the potentials of IoT than in-house professionals. The findings of the research are relevant in pushing the boundaries of public relations, considering that the use of IoT in the field is largely unexplored.

Subjects: Computer Science; General; ICT; Mass Communication; Organizational Communication; Persuasion; Public Relations

Keywords: Communication; Internet of Things; Internet Relations of Things; public relations; smart-PR

1. Introduction

Public relations (PR) has existed for decades yet it is still evolving. One of the major factors responsible for the continuous evolution of public relations in modern times is the impact of technology. For a profession whose major goals include establishing and maintaining profitable relationships as well as building mutual understanding through strategic communication, its requirement for technology cannot be overemphasized. As the means and modes of communication develop, it becomes increasingly necessary for public relations professionals to evolve fresh Information and Communication Technologies (ICTs) approaches to reach their relevant publics. Considering that several such publics may have already adopted new technologies and Internet-based communications, it becomes logical for public relations professionals to do the same to avoid missing out on valuable opportunities for relationship-building.

Several scholars have explored the adoption of Internet-related technologies or platforms for public relations activities (Dozier, Shen, Sweetser, & Barker, 2016; Scott, 2010; Tankosic, Ivetic, & Vucurevic, 2016; Wang, 2015) and others have described this new development with terms such as Digital, Online or E-Public Relations (Gifford, 2010; Petrovici, 2014; Philips & Young, 2009; Vercic, Vercic, & Sriramesh, 2015). However, there exists little or no scholarly work on the implications of the IoT for public relations. Being mindful of the proliferation of smart mobile devices and the estimation by Cisco IBSG that about 50 billion devices will be connected to the Internet by 2020 (Evans, 2011), it becomes very critical for public relations professionals to begin to interrogate the possibility of accessing more valuable data from their significant publics and sharing information through the same route. This research explores the potentials of the IoT for public relations activities in Nigeria as IoT sets to redefine the future of the profession.

2. Literature review

2.1. Public relations and the mass media

Public relations is a dynamic discipline that has been severally defined in a bid to effectively capture its essence. Baskin, Aronoff, and Lattimore (1997) observe how difficult it is to define public relations because it constantly adapts to societal needs. Nevertheless, the authors define it as a “management function that helps achieve organisational objectives, define philosophy, and facilitate organisational change” (p. 5). Another notable definition by the Public Relations Society of America (PRSA) states that it encompasses “counselling management at all levels in the organisation with regard to policy decisions, course of action, and communication, taking into account their public ramifications and the organisation’s social or citizenship responsibilities” (Adelabu, 2008, p. 621).

Among the vital responsibilities of public relations is to help organizations establish and maintain mutually beneficial relationships with parties that are directly or indirectly affected by their activities. The concept of relationship building presupposes the existence of a two-way communication channel that engenders message dissemination and feedback reception among the parties. In one of the most elaborate attempts at defining public relations, Rex Harlow, having evaluated about 500 definitions, concluded that the profession is essentially communication-based (Cutlip, Center, & Broom, 2000). Harlow identified that public relations involves the establishment and maintenance of communication lines between an organisation and its publics, resulting in acceptance, understanding, and co-operation. Public relations also assists the management of organisations to keep up with and respond to public opinion.

According to Baran (2002), almost everyone consumes public relations messages daily because the contents of several print and broadcast media are sourced from press releases. Baran identifies 14 services that are offered by public relations professionals as publicity, communication, public affairs, government relations, community relations, minority relations, financial public relations, industry relations, press agency, promotion, media relations, issue management, propaganda, and advertising. The author observes that based on the realization by organisations that even their routine decisions are affected by public opinion with potentially tremendous implications, public relations has attained more organisational significance.

Over the years, the need to communicate with a vast number of publics necessitated the engagement of the mass media—newspapers, magazines, radio, and television—for information dissemination. The mass media, though effective in reaching multitudes, were restrictive in generating the feedback necessary to evaluate the effectiveness of public relations efforts. Scott (2010) observes that the era of the dominance of the traditional media, referring to the media mentioned above, was marked by organizations investing great efforts into communicating exclusively with a few journalists to reach their vast publics. The author, however, notes that the advent of the Internet and social media platforms has enabled public relations practitioners to communicate directly with their audience.

The Internet has doubtlessly transformed the way most things are done including the research and practice of public relations (Adeyeye et al., 2019; Okorie & Salawu, 2017; Omojola, 2016; Philips & Young, 2009; Williams, Ekanem, Sobowale, & Amodu, 2017). Digital or online public relations now refers to the study or practice of public relation on the cyberspace. Consequently, the Internet offers more advantages over the traditional media in terms of increased visibility of websites through search engine optimization (SEO), real-time interaction with stakeholders, retrieval of valuable data on target audience, and tangible measurement of public relations' effectiveness, among others (Amodu, 2007; Amodu, Archibong, Aririguzoh, & Odiboh, 2018; Eray, 2016; Gabriel & Koh, 2016; Gifford, 2010; Herbst, 2014).

Castells (2000) observes that contrary to the earlier model where there is a clear dichotomy between message creators and message consumers, consumers of Internet contents are also producers, thereby resulting in an unprecedented decentralization of information. Whereas the industrial economy was earlier operational in public relations, exemplified by mass-production and dissemination of the same message (e.g. press release) in a one-to-many model, the Internet has introduced the information economy with a many-to-many approach (Holtz, 2002). Furthermore, the Internet has offered the opportunity for customized communication in public relations such that messages can be tailored to specific demography based on their needs and requirements.

Online public relations practice, also known as digital public relations, has opened new frontiers in the world of information sharing and relationship building. Gifford (2010) explains that digital public relations involves leveraging the power of online journalism network by issuing online press releases for effective enlightenment of stakeholders. The author also describes it as an opportunity to maximize the power of the Internet for a wider reach. Petrovici (2014), while justifying the need for public relations practitioners to use the Internet, states that the public's appetite for the Internet is fast growing; hence, public relations should follow suit. The author observes that during the era of traditional public relations, competition was minimal and local, since only a few people knew what others were doing. In the era of online public relations, however, there is unprecedented exposure such that clients do not need to source for agencies locally.

Baran (2002) identifies technological advancement as a major factor responsible for shaping the character of public relations over the years, with the four other factors being middle-class growth, organisational growth, improved research tools, and professionalization. The author states that advances in communication technology have improved the efficiency and effectiveness of reaching

a larger and more specific audience. Despite the huge potentials of online public relations, there still exist greater possibilities of growth thanks to the ever-evolving world of technology.

Online public relations has focused mainly on exploring a variety of Internet-based channels to send more information to relevant publics and obtain feedback. These channels include emails, websites, e-press releases, and blogs, among several others. However, these channels thrive predominantly on the public's willingness to pay attention to those sent materials and engage them. Grunig (2009) observes that several public relations practitioners follow the latest trends without adequately exploring the potentials of such trends. The author explains that as in other trends, "the traditional media frenzy of so many practitioners has been replaced by a new social media frenzy" (p. 1). Grunig, however, points out that many practitioners simply transfer the same skillsets and techniques for the traditional media to the new media, without properly engaging the "dialogical, interactive, relational and global properties that make them perfectly suited for a strategic management paradigm of public relations" (Grunig, 2009, p. 6).

Considering the amount of information available online and the publics' wide variety of options, not to mention their ability to create content for sharing in their sphere of influence, public relations should necessarily begin to explore the next option. One such option that can project public relations to the next era is the IoT.

2.2. Conceptualisation of the Internet of Things

Fletcher (2015) offers a historic background to the IoT by tracing its origin to the establishment of the MIT Auto-ID Centre in 1999. The Centre was set up to evolve a broad category of identification technologies for industrial use that would reduce errors, assist automation and enhance efficiency. A major component of that technology was the Radio Frequency Identification (RFID) tag, which enabled a centralized service to detect, uniquely identify as well as provide details of objects that were tagged. Further work resulted in the ability to track objects from production to delivery, identify production challenges, reduce human labour, and reduce theft. The author observes that development in wireless communication technologies and embedded computing further set the pace for the advancement of IoT.

It is noteworthy that there is no single or consensus definition for IoT. Nevertheless, all the definitions in one way or the other capture the essence of what it exists to achieve. For instance, Macik (2017, p. 364) defines IoT as "an ecosystem where objects equipped with sensors communicate with each other and computers or mobile devices, often autonomously, without the need for user interaction, through a variety of networking solutions, especially wireless ones". Atayero, Oluwatobi and Alege (2016, p. 2) also define it as "the interconnectedness of physical objects as a result of their ability to sense and communicate by sending and receiving messages among themselves".

Ro, Kwon, Lee, and Song (Ro, Kwon, Lee, & Song, 2017) describe IoT as the technology that brings about the interconnection of all objects to the Internet to enable them to share information among themselves. According to Nguyen and Yoo (2017), the IoT involves a gamut of technologies such as smartphones, cloud computing, embedded systems, and physical objects, which enable people, things and places to connect to the Internet at any time and from anywhere. By assigning unique identifiers to objects, they are enabled to generate and transfer data through a network without human-to-human or human-to-computer inputs. Each object is deployed with a sensor that allows it to generate data at an enormous rate.

IoT aims to interconnect all aspects of human life such that smart devices will provide notifications, give advice and offer automated assistance. According to Park, Park, Byun, and Park (2016), a study by Gartner predicted that by 2020, there will be about 25 billion Internet-connected devices. In Cisco IBSG's prediction, however, about 50 billion Internet-connected devices would be available by 2020 (Evans, 2011; Vermesan & Friess, 2013). Evans explains that in 2003,

approximately 6.3 billion people were on earth but only 500 million devices were connected to the Internet. That meant only 0.08 devices per person were connected. By 2010, when the human population on earth was 6.8 billion, the number of devices connected to the Internet had increased to 12.5 billion. For the first time, therefore, there was more than one Internet-connected device per person. Fletcher (2015) also states that according to analysis, the growth of IoT is roughly 35% year-over-year, which is anticipated to result in an estimated 2.2 trillion internet-connected devices by the year 2035.

The potential things that are expected to be connected to the Internet by 2020 include television sets, mobile communication devices, electric cars, smart homes, healthcare, and energy among others. The interconnection of all objects would allow organizations to track their products with consumers, determine their level of performance, identify needs for modifications, and offer customer care services. The implication of this is that a customer having two or more Internet-connected devices will generate tons of data from each, and more importantly, those devices will be able to communicate with each other in managing the needs of the customer with minimal human interference.

The International Telecommunication Union, ITU (2016), explains that the enablers of IoT include the cost reduction of computing, growth of Wireless Fidelity (Wi-Fi), increase of network connectivity, improvement in software development, and development of standardized low-power wireless technologies.

2.3. Public relations and the Internet of Things

The IoT offers valuable opportunities for public relations to mine and process data on relevant publics. It would also help to engage the information derived to make informed decisions as regard anticipating and attending to the needs of the various publics.

Currently, there are several public relations software that help organizations to extract online conversations, track market trends, engage with influencers, and follow the activities of competitors. Some other software programs enable organizations to locate journalists according to their beats and locations as well as offer alert services for online mentions. Nevertheless, majority of the software programs still focus on reaching out to journalists and editors instead of connecting directly to the target audience. Sending out online press releases to journalists for use still leaves them with the responsibility to screen out information since not all received materials may be accommodated. Another major limitation of the software is the lack of interconnectivity that can engender the retrieval of multiple streams of data from different devices. Again, the software and Apps can only infer general online trends of public engagement and perceptions without real-time data from individual customers or clients. While the capabilities of existing software are commendable, the engagement of the IoT for public relations, which we term “Smart Public Relations (Smart-PR)” or “Internet Relations of Things (IROt)” in this paper, will further consolidate the efforts.

One major potential of Smart-PR is to enable access to direct data from customers. IoT enables several devices surrounding the customers to be interconnected on the Internet. This means that each device is constantly generating data on the user and communicating it to other devices. With access to such data, an organization can obtain firsthand information on the needs, habits, and requirements of its customers. If Smart-PR is adopted by a bank, for instance, data can be generated directly from customers’ mobile devices on their subscriptions, bill payment, domestic expenses, and other regular transactions. By analyzing this trend, the bank will be able to send reminders when such transactions are due or alert the customer when the account balance is not sufficient for the payment. This utility function of the bank will potentially forge a deeper connection with the customers.

Smart-PR also allows the combination of multiple-source data for more accurate analysis. This helps to avoid the possibility to obtain misleading information from a single source. Data generated from customers’ mobile communication devices, computers, television sets, smart cars, etc.

can be automatically juxtaposed for a more accurate understanding of the customer's peculiarities. An energy company may adopt Smart-PR to understand customers' energy consumption habits and how to provide better satisfaction. It may not be sufficient to obtain an aggregate figure from a metre. Hence, sensors from the cooling system of the home can indicate how much energy is consumed by each unit and which room consumes the highest amount of energy. Sensors from the illumination system can do the same, as well as sensors from sockets and household appliances. With access to all these data, the energy company can make smart decisions such as reducing the energy available to a home when occupants are away or diverting more energy to communities where there is higher demand.

Monitoring customers' needs rather than the organization's mentions is another potential benefit of Smart-PR. Through the IoT, a car manufacturer, for instance, would be able to automatically track when service is due, fuel is low, repair is needed, and replacement should be made. Different components of the car with embedded sensors would provide valuable information about the driving habits of the customers. Such direct services provide more valuable mileage for an organization than mere news mention. It is also more customer-focused because it targets detecting and meeting needs.

Organisations can also anticipate the needs of their publics through Smart-PR. As in the example of the car manufacturer above, data generated from different components of the car can enable the company to send notifications to the customers before they even realise they have needs. Not only would such services ensure a satisfied customer, it would also guarantee continued patronage. Again, it would forestall the possibility of some customers switching to competing brands because they do not want to waste their time complaining about challenges with the product; or the prolonged inconvenience loyal customers may endure before deciding to make a complaint.

Communication with customers through multi-channel systems is another benefit of the adoption of IoT for public relations. Since data can be retrieved by the organization from several devices used by the customers, it is also possible that the same channels can be used to reach them. Consequently, organizations can connect with customers on multiple platforms beyond what the traditional or social media can provide. An E-health management system should be able to remind patients to use their medications, make a new order, or come in for checkups through their mobile devices, display screens in their cars or smartwatches.

Ultimately, Smart-PR will be able to provide unique and personalized services. Through the engagement of IoT, products and services can be customized to meet the peculiar needs of individual customers. This will achieve the erstwhile desire of public relations to reach a mass audience as well as connect with the specific public. Since data are gathered through sensors embedded in personalized devices of customers, messages will be tailored to the specific needs of the customers based on the data generated.

Considering how radical the concept of IoT is, it is understandable that its adoption will vary from one person or profession to another. Rogers (1983) captures this in his Diffusion of Innovation Theory. The author, who describes innovation as any object, idea or behavior that is perceived new by a population, explains diffusion as the spread of such innovation from its source to the end user. Dearing and Cox (2018) also define diffusion as a social process among people in reaction to information on an innovation. The authors further explain that time is a major factor when evaluating the diffusion of any innovation and they identify the distribution of adopters as the innovators, early adopters who are also opinion leaders, early majority, late majority, and laggards.

Blankenship (1998) applied the Diffusion of Innovation theory to research, which adopted a combination of qualitative and quantitative methods, to investigate factors related to the use of computers by instructors to teach. The findings revealed that among other variables, curriculum area and grade level were major determinants of training success. Less (2003) also engaged the theory in quantitative research to determine computer technology adoption by faculty of North

Carolina Community College System for instruction. The result of the study showed a significant relationship between the adopter categories proposed by Rogers and participants' years of teaching experience, though there was no significant difference between the categories of faculty adopters and variables such as age, gender, and race.

Rogers observes the difficulty of getting people to adopt new ideas even in the face of obvious benefits. The level of the use of new knowledge is usually lower than the level of the information available, thereby resulting in a wide gap between what is known and what is used. Rogers (1983) advances that several organisations and individuals are confronted by the common problem of closing the gap between availability and adoption, and speeding up the diffusion rate. In agreement with Rogers' concerns on the speed of adoption, Dearing and Cox (2018) report on the Extension for Community Healthcare Outcomes (ECHO) project, which was designed to create collaboration between academic medical centres and rural primary care clinicians. The authors observe that 14 years after the innovation was initiated, it did not make a significant impact.

Discourse on the IoT in Nigeria is still emerging, with authors mainly focusing on the readiness of the country to adopt the technology or potential benefits and challenges. For instance, Atayero et al. (2016) conducted research on the readiness of Nigeria and other Sub-Saharan African (SSA) countries to adopt IoT using parameters such as Network Ready Index (NRI), ICT Development Index (IDI), Global Innovation Index (GII), Global Competitive Index (GCI), and Knowledge Economy Index (KEI). The study revealed that not only were the SSA countries lagging considerably behind in all the indices as compared to other regions, except in GII, Nigeria that is considered the largest economy in SSA was not among the top 10 performing countries in all the indices evaluated. Also, Kunle, Olubunmi, and Sani (2017) carried out a study on the key issues militating against IoT readiness in Nigeria. The study found variables such as quality of service, quality of experience, government policies, infrastructure, and privacy among others as challenges of IoT adoption in Nigeria.

While the above may appear to paint a bleak picture of Nigeria in terms of technology adoption, the Nigerian Communication Commission's (NCC) 2019 report shows the number of mobile phone subscribers in Nigeria as at April 2019 to be 173, 641, 060, with a teledensity of 90.97% (NCC, 2019a). The report further shows that as of April 2019, there were 119, 506, 430 active Internet subscribers across all the mobile network services in Nigeria (NCC, 2019b). This offers a great opportunity for organisations that are interested in IoT to begin to strategize on how to take advantage of the number of devices that are already connected to the Internet. Consequently, the current research aimed to explore what public relations professionals believed on the importance of IoT data to their activities.

3. Statement of the problem

The adoption of the IoT in different disciplines and professions offers an unprecedented opportunity for data to be accessed and used for smart decision-making. If adopted in public relations, avenues would be created to gather data from relevant publics, thereby enhancing relationship building, customer satisfaction, earlier crisis detection, and improved two-way communication.

However, some public relations professionals still tend to use the new media for information sharing rather than for engagement. They also tend to be more comfortable with offline interactions while limiting online activities to social media posts. There is also the concern of the openness to new technology adoption by in-house and independent public relations professionals considering that the former serves a single organisation while the latter serves several different clients.

If there are still challenges with the full adoption of the new media, it raises the concern about the ability of public relations professionals to see the potentials of the adoption of IoT for their activities. Also, considering the predictions of the number of internet-connected devices in the nearest future, which would result in users synchronizing multiple devices for optimum user experience, public relations may miss out on valuable opportunities for greater relationship building and more effective communication.

This study, therefore, investigates in-house and independent (or Agency/Consultancy) public relations professionals' perspectives on the potentials of the adoption of the IoT for their activities.

The hypotheses generated for this study are:

Hypothesis one: H1 Independent public relations firms are more likely than In-house public relations departments to seek customers' real-time data through IoT.

Hypothesis two: H2 Independent public relations firms are more likely to seek increased channels of reaching customers through IoT than in-house public relations departments.

Hypothesis three: H3 There is a likelihood that independent public relations firms will seek to predict customers' needs through IoT than in-house public relations departments.

Hypothesis four: H4 Independent public relations firms are more likely than In-house public relations departments to seek to customize customers' messages through IoT.

4. Method

A survey was conducted to show what public relations professionals in Nigeria thought of the potentials of the IoT for their activities. Eyrich, Padman, and Sweetser (2008) state that public relations professionals are now on par with online tools adoption. Also, IoT concerns the interconnectivity of devices online. Consequently, the survey was conducted online to confirm the response rate of professionals in Nigeria. The questionnaire was administered from November 2018 to April 2019.

To encourage significant participation in this research, the prospective respondents were identified through the membership of the Nigerian Institute of Public Relations (NIPR) and the Public Relations Consultants Association of Nigeria (PRCAN). Emails sent and phone calls were made to the organisations. Recruitment was also done through major social media platforms like LinkedIn, Facebook, Twitter and Instagram with public relations related groups and accounts being the target. The recruitment method was adopted to enable the researchers to monitor the response rate, respondents' suitability, proper completion of the questionnaire, respondents' general comments.

Two categories of respondents participated in the research. The first category consisted of professionals in independent public relations firms. The firms were stand-alone organisations servicing the needs of several clients. It was expected that the experiences of the respondents in those firms would be unique because of the need to attract and maintain clients. The second category consisted of professionals in in-house public relations departments. The departments were units within a larger organisation, for instance, a manufacturing company. The departments only attended to the needs of the parent company as concerns its customers and that would offer a different experience for the respondents from the departments.

After the 6-months administration period, only 100 questionnaires were properly filled and could be used for the analysis. It was observed from feedbacks that several public relations professionals would have been more comfortable with the hard copy questionnaire rather than the online form, which gave an impression of how comfortable they were online. T-test was used to analyse the data to establish the results across the groups evaluated.

5. Result

H1: Independent public relations firms are more likely than In-house public relations departments to seek customers' real-time data through IoT.

Group statistics										
	Organisation type	N	Mean	Std. deviation	Std. error mean					
Receive realtime data on customers	Independent PR firm	36	1.53	.736	.123					
	In-house PR unit	64	1.48	.797	.100					

Independent samples test										
		Levene's test for equality of variances		t-test for equality of means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	95% confidence interval of the difference	
									Lower	Upper
Receive realtime data on customers	Equal variances assumed	.003	.960	.269	98	.789	.043		-.277	.364
	Equal variances not assumed			.275	77.587	.784	.043		-.271	.358

There was a significant difference between the independent public relations firms' seeking of customers' real-time data through the IoT and the in-house public relations departments' seeking of the same ($t = 0.269$, $df = 98$, $p = 0.395$, one-tailed). The independent public relations firms required more customers' real-time data (mean = 1.53) than the in-house public relations departments (mean = 1.48).

H2: Independent public relations firms are more likely to seek increased channels of reaching customers through IoT than in-house public relations departments

Group statistics										
	Organisation type	N	Mean	Std. deviation	Std. error mean					
Increase channels of reaching customers	Independent PR firm	36	1.58	.841	.140					
	In-house PR unit	64	1.50	.667	.083					

Independent samples test										
		Levene's test for equality of variances		t-test for equality of means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	95% confidence interval of the difference	
									Lower	Upper
Increase channels of reaching customers	Equal variances assumed	3.143	.079	.545	98	.587	.083		-.220	.387
	Equal variances not assumed			.511	59.959	.611	.083		-.243	.409

There was a significant difference between the independent public relations firms' likelihood to seek more channels to reach customers through the IoT and that of the in-house public relations departments ($t = 0.545$, $df = 98$, $p = 0.293$, one-tailed). The independent public relations firms required more channels to reach their customers through IoT (mean = 1.58) than the in-house public relations departments (mean = 1.50).

H3: There is a likelihood that independent public relations firms will seek to predict customers' needs through IoT than in-house public relations departments

Group statistics										
	Organisation type	N	Mean	Std. deviation	Std. error mean					
Predict customer needs	Independent PR firm	36	1.67	.956	.159					
	In-house PR unit	64	1.52	.797	.100					

Independent samples test										
		Levene's test for equality of variances		t-test for equality of means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	95% confidence interval of the difference	
Predict customer needs	Equal variances assumed	1.057	.306	.846	98	.400	.151	.179	-.203	.505
	Equal variances not assumed			.804	62.385	.425	.151	.188	-.225	.527

There was a significant difference between the independent public relations firms and the in-house public relations departments' possibility to seek to predict customers' needs through the IoT ($t = 0.846$, $df = 98$, $p = 0.2$, one-tailed). The independent public relations firms were more likely to seek to predict customers' needs through IoT (mean = 1.67) than the in-house public relations departments (mean = 1.52).

H4: Independent public relations firms are more likely than In-house public relations departments to seek to customize customers' messages through IoT

Group statistics					
	Organisation type	N	Mean	Std. deviation	Std. error mean
Customize messages for customers	Independent PR firm	36	1.58	.806	.134
	In-house PR unit	64	1.55	.733	.092

Independent samples test										
		Levene's test for equality of variances		t-test for equality of means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	95% confidence interval of the difference	
									Lower	Upper
Customize messages for customers	Equal variances assumed	.142	.707	.230	98	.818	.036	.158	-.278	.351
	Equal variances not assumed			.224	67.068	.823	.036	.163	-.288	.361

There was a significant difference between the independent public relations firms and the in-house public relations departments' possibility of seeking to customize customers' messages through the IoT ($t = 0.230$, $df = 98$, $p = 0.409$, one-tailed). The independent public relations firms were more likely to seek to customize their customers' messages through IoT (mean = 1.58) than the in-house public relations departments (mean = 1.55).

6. Discussion of findings

Bosunia, Hasan, Nasir, Kwon, and Jeong (2016) state that through IoT, billions of heterogeneous devices such as smart home appliances and several other wireless or wired physical objects are interconnected, thereby enabling them to cooperate in creating a smart world. The ever-growing network of devices enables the sharing of real-time data with a wide range of possibilities. Bosunia et al. (2016) also observe that IoT has already been adopted for applications such as real-time traffic monitoring, fire detection, and military surveillance, among others. Having identified access to real-time data as one of the potentials of IoT (CISCO, 2016; Vermesan & Friess, 2013), the first hypothesis of this study tested the views of independent and in-house public relations professionals on their likelihood to seek their customers' real-time data through the IoT. The result showed that the former group was more likely to seek out the data than the latter.

The second hypothesis tested the difference between the possibility of independent and in-house public relations professionals seeking more channels to reach their customers. Most of the communication protocols that are currently used in the IoT rely on host-to-host or point-to-point connection (Bosunia et al., 2016). The attribute of the protocol is that every object or device that is connected is given a unique address and identity, which makes it trackable. This means that as specific data can be retrieved from a specific device, information can also be sent to that isolated device. Hence, with multiple internet-connected devices comes the possibility for public relations professionals to send information through multiple channels to customers. The current research revealed that independent public relations firm respondents were more likely to seek more communication channels to reach their customers than the respondents from in-house public relations departments.

Vermesan and Friess (2013), while discussing IoT and sensors, explain Complex Event Processing (CEP) as an emerging network technology with the capability to create actionable situation-based knowledge from applications and databases in real-time. This technology can enable organisations to "define, manage and predict events, situations, exceptional conditions, opportunities and threats in complex, heterogeneous networks" (p. 91). CISCO (2016) also explains that the actual benefit of using IoT-enabled sensors comes from the ability of analysts, communities, and experts to utilize the collected data efficiently to predict and plan for the future. The third hypothesis of the research tested the likelihood of independent and in-house public relations professionals to seek to predict customers' needs through IoT. The result showed that there was a difference between the two categories as the independent professionals were found to be more likely to seek the predictive potentials of the IoT than their in-house counterpart.

According to CISCO (2016), sensors, which constitute a major part of IoT, require to be highly customized to be effective when they are broadly deployed to surmount several challenges, because customization enables sensors to give added value to IoT. Multiple-point data gathering through IoT enables customer profiling and this in turn makes it possible for customer-specific messages to be disseminated. The final hypothesis for the study measured the likelihood of independent or in-house professionals to seek to customize messages to their customers. The result revealed the independent public relations professionals having a higher likelihood than the in-house professionals.

7. Conclusion and recommendations

The pervasiveness of the Internet and the extent to which several aspects of human existence depend on it make it hardly believable that Internet only became commercially available to the public in the 1980s. The advent of the Internet was welcomed by applause and skepticism alike, as users as well as scholars weight the pros and cons of its use. Nevertheless, one thing was certain- the Internet could not be stopped (Usaini et al., 2018). In like manner, the full adoption of the IoT may appear remote today, but with the constant increase in the number of Internet-connected devices, it may be sooner than later.

Michaelson and Stacks (2010) identify the difference between corporate (in-house) and agency (independent) professionals to be the measurement of their public relations practice. In the research on public relations entrepreneurship, O'Neil, Hays, and Bagwell (2013) list pricing, budgeting and business management among the topics that students who are interested in independent public relations (agency) practice should learn. Morley (2004) captures one of the major differences between independent and in-house public relations professionals by stating that the advice of external professionals is usually taken with skepticism because the organisation tends to second-guess their ability to take responsibility for the outcome; on the other hand, in-house professionals are believed to have insight into the needs and ways of the organisation.

This research evaluated what public relations professionals think about the potentials of adopting the IoT for their activities, with particular interest in categorizing them as independent and in-house public relations professionals. The outcome revealed that both categories were likely to seek real-time customer data, increased channels to reach customers, predict customer needs, and customize customer messages through the IoT. It was, however, discovered that the independent professionals had a higher tendency in all the variables. This conclusion may be explained by Morley's (2004) distinction between the two categories as stated earlier. Considering that in-house professionals are believed to have a clear insight into the needs of their parent companies, they may require less of the benefits available in the variables tested. On the other hand, independent public relations professionals, being external to the companies they serve, would require all the means possible to learn more and connect more with the companies through IoT.

Based on the foregoing submission, we recommend that Smart-PR should be adopted, as it presents a new dimension of opportunities for public relations professionals. Not only should its adoption be made an agenda, professionals should also join the conversation of this new technology and help shape how it will affect the public relations practice.

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