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Customer perceptions towards innovation products in the sphere of privacy versus security debate (the case of transmission x-ray body scanners in the UK)

Oczekiwania klientów wobec innowacji produktowych w sferze prywatności versus debata bezpieczeństwa (studium przypadku prześwietleń promieniami rentgenowskimi w Wielkiej Brytanii)

Abstract: *This article attempts to establish potential applications for widening the use of transmission x-ray full body scanners in the United Kingdom (UK) as the product of innovation. It is the first research project of its kind and findings will be able to assist government agencies in enhancing current security systems within the transport and prison sectors of the UK. In addition, product manufacturers will be able to adjust their marketing and product development strategies. The main findings of this study demonstrated that introducing the product within the UK air transport and prison sectors could enhance individual privacy. The product would also be able to combat the issue of contraband trafficking within the air transport and prison sectors of the UK to enhance security. It was, however, highlighted that the product would not significantly improve staff and inmate safety within the prison sector. The issue of data security was also discussed and frequent travelers did not view the data produced by the product as being damaging to individual privacy, whilst a prison security manager viewed data security as one of the most significant issues associated with widening the use of the equipment. The results also demonstrated that transmission x-ray full body scanners are not suitable to be used within the UK rail network as the equipment would cause major inconveniences for train passengers. The next section of this article will focus on discussing introduction of the innovation product in the sphere of the debate of privacy vs. security.*

Keywords: innovation product, customer perceptions, product development strategies, debate of privacy and security

Streszczenie: *W artykule podjęto próbę ustalenia potencjalnych zastosowań rozszerzenia wykorzystania skanerów rentgenowskich w Wielkiej Brytanii (UK) jako produktu innowacji. Jest to pierwszy projekt badawczy tego rodzaju, a jego wyniki mogą pomóc agencjom rządowym w poprawie obecnych systemów bezpieczeństwa w sektorze transportu i więziennictwa w Wielkiej Brytanii. Ponadto, producenci produktów będą mogli dostosować swoje strategie marketingowe i rozwoju produktów. Główne ustalenia tego badania wykazały, że wprowadzenie produktu w brytyjskich sektorach transportu lotniczego i więziennictwa może zwiększyć indywidualną prywatność. Produkt mógłby również zwalczać kwestię handlu narkotykami w sektorze transportu lotniczego i więziennictwa w Wielkiej Brytanii w celu zwiększenia bezpieczeństwa. Wyraźnie podkreślono jednak, że produkt nieznacznie poprawi bezpieczeństwo personelu i więźniów w sektorze więziennym. Omówiono również kwestię bezpie-*

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czeństwa danych, często podróżujący nie uważali danych wytworzonych przez ten produkt za szkodliwy dla prywatności, podczas gdy menedżer ds. bezpieczeństwa więziennego uznał, że bezpieczeństwo danych stanowi jedno z najważniejszych problemów związanych z poszerzeniem użytkowania sprzętu. Wyniki wykazały również, że prześwietlane skanery rentgenowskie nie nadają się do wykorzystania w ramach sieci kolejowej w Wielkiej Brytanii, ponieważ sprzęt spowodowałby poważne niedogodności dla pasażerów pociągów. Następna część tego artykułu skupia się na omówieniu wprowadzenia produktu innowacyjnego w sferze debaty na temat prywatności i bezpieczeństwa.

Słowa kluczowe: innowacja, postrzeganie klientów, strategie rozwoju produktu, debata na temat prywatności i bezpieczeństwa.

Introduction

Due to constant technological improvements in the sphere of security technology, companies are now able to provide increasingly advanced innovative solutions that could assist governments and law enforcement agencies in combating crime and terrorism worldwide. Despite the development of security full body scanners some time ago, their present usage is now attracting far more attention than before³. Recently, the balance between privacy versus security debate has shifted towards the security side due to a number of dramatic events in the recent past⁴. The literature, however, demonstrates that there are still plenty of privacy issues associated with full body scanners and the extent to which that technology should be used⁵. The central focus of this study examines the issues surrounding widening the use of transmission x-ray full body scanners. Both researchers and practitioners who seek to understand the British public perception with regards to transmission x-ray technology and its possible applications will benefit from this study. It is also intended that this research should assist product developers in adjusting their strategies for minimizing some negative effects and perceptions of these particular technological applications.

The central focus of this study examines the issues surrounding widening the use of transmission x-ray full body scanners. American National Standards Institute defined the technology as: *A security screening system using the conventional means of radiographic imaging in which x-rays or gamma rays pass*

³ The Economist, 2013. *X no longer marks the spot* [Online]

Available at: <http://www.economist.com/blogs/gulliver/2013/01/airport-security-body-scanners>

[Accessed 12th March 2017]; Fox News, 2011. *Cook County Jail Unveils New Body Scanners for Processing Prisoners* [Online].

Available at: <http://www.myfoxchicago.com/story/17800336/cook-county-jail-unveils-new-body-scanners-for-processing-prisoners> [Accessed 12th March 2017]; Financial Times, 2009. *Dutch to use body scanners for US flights* [Online]

Available at: <http://www.ft.com/cms/s/0/51461dd0-f54a-11de-90ab-00144feab49a.html#axzz2NLCr2Qib> [Accessed 2nd April 2017].

⁴ O. Mironenko, Body scanners versus privacy and data protection. *Computer Law Security Review*, 27, 2011, pp. 232-244.

⁵ K. Aquilina, 2010. Public Security Versus Privacy in Technology Law: A balancing act? *Computer Law and Security Review*, 26, 2010, pp. 130-143; M. Murphy, M. Wilds, 2001. X-Rated X-ray Invades Privacy Rights. *Criminal Justice Policy Review* 12, 2001, pp. 333-343; P. Chhanabhai, A. Holt, Consumers Are Ready to Accept the Transition to Online and Electronic Records If They Can Be Assured of the Security Measures. *Medscape General Medicine*, 9, 2007, pp. 8-27.

through a target (e.g., person or container) and create shadow-grams of enclosed objects (e.g., contraband) based on their radiation attenuating properties

The reason for selecting transmission x-ray technology over others is because that this technology possesses an ability to detect both externally and internally concealed objects, therefore making it a more advanced system if compared to competitors⁶. Alternative technologies (Backscatter and Millimetre wave) are only able to detect external concealments which limit their future application possibilities. Moreover, academic studies that focus exclusively on transmission x-ray technology are absent from current literature and previous research examining full-body scanners has been focused primarily on the United States (US).

The main aim of this paper is to put transmission x-ray body scanners in perspective of current discussions about acceptance of innovative products by general public, privacy versus security debate and a number of other themes which surround acceptance of new security solutions by so-called indirect customers. Qualitative research design was used in this inductive study in order to obtain rich and in-depth data with regards to potential acceptance of this new technology in the UK. Thematic analysis techniques were also used as part of the data analysis.

Transmission X-ray Technology as a Product of Innovation

Transmission x-ray full body scanners can be seen as an innovative product, which possess an ability to significantly enhance current security measures in a variety of areas. The advantage of this type of personal inspection equipment is based on the ability of the technology to detect both internally and externally concealed items, unlike other full body scanning systems and metal detectors⁷. Present standard security systems and surface body scanners could well be seen as being ineffective in the light of terrorists using advanced methods, such as implanting explosives under the skin, in order to avoid detection⁸.

The correlation between the product and any potential security gains as well as possible losses of privacy will be a central theme of the article.

The importance of customer attitudes is highlighted by a number of researchers in the sphere of product development and marketing; Statt⁹ emphasized that people's reactions to brands and products are crucially important in terms of product development. Any product must react to these perceptions as well as the attitudes of users and those that are affected by its use. Foxall¹⁰ also

⁶ Adani Systems, *ConPass Checkpoint: Personnel Security Screening System* [Online], Available at: http://security.adanisystems.com/en/catalog/personal_inspection/adani_conpass/ [Accessed 24th February 2017].

⁷ S. Lyster, *Transmission X-Ray Technology and its applications*. [Telephone Interview] (Personal Communication, 6 March 2017)

⁸ British Broadcasting Corporation, 2011. *US warns airlines of threat of 'implanted bombs'* [Online] Available at: <http://www.bbc.co.uk/news/world-us-canada-14061884> [Accessed 21st February 2017]

⁹ D. Statt, *Understanding the Customer: A Psychological Approach*. Basingstoke: MacMillan Press Ltd. 1997.

¹⁰ G. Foxall, *Consumer Behaviour: A Practical Guide*. Newcastle-Upon-Tyne: University of Newcastle-Upon-Tyne 1977.

highlighted that consumer attitudes are directly linked to consumer behaviour, therefore determining the demand for goods or services, thus customer perceptions with regards to the technology must be examined.

Transmission x-ray full body scanners are a relatively new technology, which could potentially revolutionize security procedures across a wide variety of applications including: transport security; correctional facilities; border crossings; mining sites; and other high security locations where there is a need for detailed and thorough personal inspection of individuals. One might argue, therefore, that it could be regarded as an innovative product¹¹. It can be claimed that innovative products affect customer perceptions in a variety of ways and depending on the value to the customer; they could be either accepted or rejected. Szmigin¹² argued that unless the customer feels that there is a need for the product, he or she could resist it, hence, innovative technologies are far more likely to be accepted if they are able to assist customers in saving time, especially in the case of the UK. This is because “Western” cultures often view time-saving devices as adding value to the every-day lives of individuals, due to the intense lifestyles of many people in the “Western” world, with the product potentially contributing to improving efficiency in a number of security applications. When discussing using the product for transport security, it could be argued that transmission x-ray full body scanners will be able to save time if they substitute standard security procedures at airports. That is due to the fact that personal inspection often involves a variety of tasks which are relatively time consuming if compared to using transmission x-ray for individual inspection¹³.

There are, however, a number of barriers associated with the acceptance of new technologies in general and also specifically related to this innovation. It is important to consider these factors as they can impact on consumer acceptance and hold significance in terms of product development and the marketing of the product as well as in determining the research design for this study. Ram and Sheth¹⁴ highlighted two forms of barrier, functional and psychological, which prevent customers from accepting innovative products. Functional barriers include risks associated with product usage, product usage patterns, and product value, whilst psychological barriers arise from the conflict between any accepted norms caused by the product. The attitudes of people towards the aforementioned factors must be examined as they determine product acceptance as well as highlighting specific issues that must be addressed through marketing and product development. One could argue that individuals might view the equipment as dangerous due to the fact that it uses ionizing radiation¹⁵. Another potential barrier to individuals accepting the product is the fact that widening the use of the technology would revolutionize security inspection systems including transport

¹¹ OECD, 2005. *Glossary of Statistical Terms: Product Innovation* [Online]

Available at: <http://stats.oecd.org/glossary/detail.asp?ID=6868> [Accessed 20th February 2017].

¹² I. Szmigin, *Understanding the Consumer*. London: Sage Publications Ltd. 2003.

¹³ S. Lyster, 2017. *Transmission X-Ray Technology and its applications*. [Telephone Interview] (Personal Communication, 6 March 2017).

¹⁴ S. Ram, J. Sheth, Consumer resistance to innovations: the marketing problem and its solutions. *Journal of Consumer Marketing* 6, 1989, pp. 5-14.

¹⁵ M. Lavine, The Early Clinical X-Ray in the United States: Patient Experiences and Public Perceptions. *Journal of the History of Medicine and Allied Sciences* 67, 2012, pp. 587-625.

security, and this uncertainty about changing current security systems might facilitate some resistance towards widening the use of transmission x-ray full body scanners. Nevertheless, the potential risk, both in terms of health and safety, and contradiction of current widely accepted social and psychological norms were highlighted by Ram and Sheth as potential barriers to acceptance of the product, therefore those issues must be empirically tested in relation to this particular technology.

The current use of transmission x-ray full body scanners is limited to specific institutions and organizations that use the product in order to maintain high levels of security under various circumstances, such as: prisons; diamond and gold mines; airports; and high security infrastructure. That weakens the link between individual attitudes and demand for the product because usage of transmission x-ray full body scanners is limited to governmental agencies and members of the public do not act as direct consumers. One could, however, propose that even though citizens do not act as direct customers, their attitudes are still important and will determine further development and deployment of x-ray full body scanning systems as well as other security enhancing technologies. This claim is supported by Blum¹⁶, who argued that the consequences of a business activity have wider effects on society as a whole and are not just limited to those that are directly influenced by the product and its use. One must also support the premise that due to the democratic nature of the UK government, public sentiment regarding certain technologies could influence legislation in relation to inflating the use of controversial equipment¹⁷. The primary focus of the next section will be to analyze the security aspect of widening the use of the product as well as evaluating the effect of this particular technology on certain security threats within the UK.

UK Consumer Acceptance of Security Innovation Technologies

There have been a number of debates regarding the justification of using potentially intrusive innovative technologies in recent times. The main argument that promulgates the use of invasive technologies is based on the grounds of public safety and its superior importance¹⁸ supported this view by arguing that crime remains a major public concern and the introduction of more advanced security technologies act as a general risk reduction tool for law enforcement agencies and citizens in general. It is needless to say that in the aftermath of significant terrorist attacks in the US and the UK the population became more concerned about security issues and potential terrorist threats. A study conducted by Nacos, Bloch-Elkon, and Shapiro¹⁹ demonstrated that there is a direct link between perceptions of public safety and anti-terrorist preventive measures un-

¹⁶ M. Blum, *Psychology and Customer Affairs*. New York: Harper and Row Publishers 1977.

¹⁷ UK Parliament, 2013. *Parliament and Government* [Online], Available at: <http://www.parliament.uk/about/how/role/parliament-government/> [Accessed 27th February 2017].

¹⁸ O. Mironenko, Body scanners versus privacy and data protection. *Computer Law Security Review* 27, 2011, pp. 232-244, D. Harris, Superman's X-Ray Vision and the Fourth Amendment: the New Gun Detection Technology. *Temple Law Review* 69, 1996, pp. 1-60.

¹⁹ B. Nacos, Y. Bloch-Elkon, R. Shapiro, Prevention of Terrorism in Post-9/11 America: News Coverage, Public Perceptions, and the Politics of Homeland Security. *Terrorism and Political Violence* 20, 2008, pp. 1-25.

dertaken by the government. It is important to highlight that people feel safer if governments concentrate on domestic prevention of terrorist attacks, rather than focusing on offensive measures, such as fighting terrorism abroad. Therefore, widening the use of the product under examination in countries that actively try to minimise the risk of terrorist attack could contribute to better perceptions of safety among the general population of that specific state.

The first important issue which requires closer analysis is drug trafficking into the UK. According to the European Monitoring Centre for Drugs and Drug Addiction²⁰, the UK has the highest percentage of cocaine, amphetamine, ecstasy, and LSD prevalence among its adult population compared to any other European Union state. This indicates both the high demand for illegal drugs within the British market as well as the significance of the drug problem within the country. Her Majesty's Revenue and Customs (HMRC)²¹ stated that the amount of seized drugs (including heroin, cocaine, ecstasy, and cannabis) trafficked into the UK for the year 2002-2003 was equal to 70,539 kilograms. It is important to recognize that the amount seized represents only a fraction of all drugs being illegally imported into the UK. HMRC also highlighted that some of the most common drug smuggling techniques, which are used by individuals who attempt to smuggle illegal substances into the UK, include swallowing and stuffing into the body cavity, as well as carrying drugs on the body. The above information suggests that drug trafficking into Great Britain is a serious problem for the government and society in general; nevertheless, Lyster²² observed that UK Customs currently use Conpass full body scanners, but their application is limited to scanning suspected drug carriers upon their arrival in Great Britain. One could argue that widening the use of equipment and using it for general travellers could potentially increase the level of protection against drug smuggling into the country. In addition, the product is capable of detecting internal and external concealments based on density analysis, hence swallowing and stuffing into the body cavity as well as carrying drugs on the body of an individual could be immediately reduced²³. Therefore, establishing and analyzing general public perceptions in relation to widening the use of Conpass full body scanners in the sphere of transport security would demonstrate the level of product acceptance and assist decision making bodies with whether to widen the use of such equipment.

Another significant security issue, which the product could address, is the illegal contraband problem within the UK correctional system. In the 2011-2012

²⁰ European Monitoring Centre for Drugs and Drug Addiction, 2013. *Table GPS-1. Lifetime prevalence of drug use by age and country, most recent national general population survey available since 2000* [Online] Available at: <http://www.emcdda.europa.eu/stats13#display/stats13/gpstab1b> [Accessed 24th February 2017].

²¹ HM Revenue and Customs, 2013. *Drug Smuggling* [Online] Available at: http://customs.hmrc.gov.uk/channelsPortalWebApp/channelsPortalWebApp.portal?_nfpb=true&_pageLabel=pagePractitionerZone_ShowContent&propertyType=document&featurearticle=true&id=HMCE_CL_001327#P19_1663 [Accessed 24th February 2017].

²² S. Lyster, 2017. *Transmission X-Ray Technology and its applications*. [Telephone Interview] (Personal Communication, 6 March 2017).

²³ Adani Systems, 2013. *ConPass Checkpoint: Personnel Security Screening System* [Online], Available at: http://security.adanisystems.com/en/catalog/personal_inspection/adani_conpass/ [Accessed 24th February 2017].

annual report from HM Chief Inspector of Prisons for England and Wales²⁴ it was highlighted that 24% of the prisoners surveyed stated that it was easy to obtain drugs within their prison. Although Scotland and Northern Ireland were excluded from data collection, the figure of 24% within English and Welsh correctional institutions demonstrates the widespread availability of illegal substances within the prison sector. Moreover, according to the UK Parliament²⁵, 70% of offenders report drug misuse prior to prison admittance and 51% report drug dependency, demonstrating the seriousness of the problem in terms of both supply and demand. Figures from Transparency International UK²⁶ demonstrate that the illegal drugs trade within the UK's correctional facilities are estimated to be £100 million per year, exposing the sheer scale of the problem. The contraband of illegal items within the UK prison sector is not limited to drugs, between 2006 and 2007, 3,473 phones and SIM cards were confiscated from inmates within the correctional system. It is argued that communication devices facilitate organized crime within the prison sector as well as enabling convicted individuals to contribute to criminal activities from inside prison. One could reason that contraband detection could be improved by introducing the equipment for regular scanning of inmates, visitors and prison sector workers due to the fact that the product under examination is capable of detecting both internally and externally concealed items²⁷. Moreover, positive use of the technology in the US prison sector also justifies widening of the use of ConPass full body scanners for this particular application, as traditional methods of inmate searching often cannot detect internally concealed items²⁸.

Role of Privacy in Acceptance of New Security Technologies

Privacy is one of the most significant public concerns with regards to expanding the use of security equipment, which includes full body scanners²⁹. There are concerns surrounding the level of privacy intrusion and inconvenience for users, most of whom are law abiding citizens (Murphy and Wilds, 2001). Moreover, Leo (2007) suggested that air transport passengers' sensitivity to privacy issues associated with airport security checks are higher than their perception of security threats. Kilou (2008) argued that the human body plays a significant role in individual privacy. Intrusion upon an individual's body can lead to high levels of

²⁴ HM Inspectorate of Prisons, 2012. HM Chief Inspector of Prisons for England and Wales: Annual Report 2011–12 [Online], Available at: <http://www.justice.gov.uk/downloads/publications/corporate-reports/hmi-prisons/hm-inspectorate-prisons-annual-report-2011-12.pdf> [Accessed 25th February 2017].

²⁵ UK Parliament, 2012. *Drugs in Prisons* [Online]

Available at: <http://www.publications.parliament.uk/pa/cm201213/cmselect/cmhaff/184/18409.htm> [Accessed 25th February 2017].

²⁶ Transparency International UK, 2013. *Corruption in Prisons* [Online], <http://www.transparency.org.uk/our-work/corruption-in-the-uk/prisons> [Accessed 25th February 2017].

²⁷ Adani Systems, 2013. *ConPass Checkpoint: Personnel Security Screening System* [Online]

Available at: http://security.adanisystems.com/en/catalog/personal_inspection/adani_compass/ [Accessed 24th February 2017].

²⁸ Fox21News, 2012. *Jail eliminates strip search, inmates now get full body scan* [Online], Available at: <http://www.fox21news.com/news/video.aspx?list=194968&id=757646> [Accessed 25th March 2017].

²⁹ K. Aquilina, Public Security Versus Privacy in Technology Law: A balancing act? *Computer Law and Security Review* 26, 2010, pp. 130-143.

humiliation as well as the loss of dignity, due to the fact that full body scanners could be viewed as an intrusive technology, their effect on the privacy of the individual requiring examination. Nevertheless, Murphy and Wilds (2001) argued that if a full-body scan is compared to a strip search, privacy violation is perceived as being much greater as the result of a the latter, due to the fact that the security officer must make physical contact with a suspect during a search. Scanning technology requires no physical contact between security personnel and a suspect during the examination process. Differences in full body scanners from the image perspective often get ignored but are significantly important from a privacy point of view. Murphy and Wilds (2001)³⁰ refer in their study to backscatter technology, which could be seen as more invasive than transmission x-ray. Lyster³¹ pointed out that transmission x-ray technology possesses advantages over backscatter as it provides greater detail, both for external and internal concealments, while at the same time not showing personal details of the outer form of the human body, offering the user additional security screening capacity and greater privacy.

Burkart³² also contends that privacy is a fluid concept and the nature of privacy is constantly changing and evolving in society. One could, therefore, argue that people's perception of privacy is dependent on circumstances and factors, such as, likelihood of a terrorist attack. It could be argued that during periods of high security risk individuals would be more willing to sacrifice their privacy in order to improve overall public safety, even though Murphy and Wilds (2001) argued that body scanners are less intrusive than a strip search, one must examine how the general public views wider use of full body scanners. The analysis of public perceptions of transmission x-ray full body scanning systems would be beneficial to the development of legislation by governing bodies as well as for product development and marketing by manufacturers and developers of the technology.

Data Protection

Data security is another aspect of individual privacy, which requires closer examination; Phelps, Nowak, and Ferrell³³ argued that from an individual perspective, personal data gathering can be viewed as an issue with consumers holding strong attitudes towards different types of personal data gathering. Individuals are most concerned with the security of their financial data, and personal identifiers. Full body scanning is a process that generates personal data through image production. It is debatable whether or not individuals can be identified

³⁰ M. Murphy, M. Wilds, X-Rated X-ray Invades Privacy Rights. *Criminal Justice Policy Review* 12, 2001, pp. 333-343, J. Leo, A Study Of Passenger Perception And Sensitivity To Airport Backscatter X-Ray Technologies. *International Business and Economics Research Journal* 6, 2007, pp. 11-18, D. Kilou, Backscatter body scanners – A strip search by other means. *Computer Law and Security Report* 24, 2008, pp. 316-325.

³¹ S. Lyster, 2013. *Transmission X-Ray Technology and its applications*. [Telephone Interview] (Personal Communication, 6 March 2013).

³² G. Burkart, When Privacy Goes Public: New Media and the Transformation of the Culture of Confession, [in:] H. Blatterer, P. Johnson and M. Markus, eds. 2010. *Modern Privacy: Shifting Boundaries, New Forums*. Basingstoke: Palgrave MacMillan 2010.

³³ J. Phelps, G. Nowak, E. Ferrell, Privacy Concerns and Consumer Willingness to Provide Personal Information, *Journal of Public Policy and Marketing* 19, 2000, pp. 27-41.

through image analysis and this particular correlation must be analyzed through further empirical research. Increased concerns over privacy violations associated with data collection and security have also been highlighted by Chhanabhai and Holt³⁴; their US based study demonstrated that 73% of the sample raised concerns over privacy and the security of their electronic health records. Even though health records could be seen as a different type of data if compared to images taken by transmission x-ray full body scanners, it is still important to analyze consumer perceptions in relation to data gathering processes and information security in general. This further highlights the importance of privacy and information security in relation to the product analysis, especially products that gather individual data.

Cultural Perspective is Widening the use of Security Technologies

It could be argued that culture is one of the most significant factors impacting on consumer behaviour and taste. Levitt³⁵ maintained that the emergence of global markets and brands acted as a convergent factor as well as promoting the homogenization of consumer behaviour and tastes. On the converse, De Mooij and Hofstede³⁶ claimed that products as well as marketing activities have to be adjusted to local cultures in order to maximize their success within a certain country. It is also important to consider that individuals of different cultures often emphasize different features of the same product when making decisions with regards to purchasing goods or services, this can be due to cultural differences and consumers looking for features that could better fit into their own values and habits. Therefore, depending on the country of application, different aspects of the same product can hold greater significance than others³⁷. Smith and Meiksins³⁸ supported this by arguing that culture acts as a strong divergent factor both in the spheres of business and society.

It can be asserted that personal privacy and identity protection are values, differing depending on the country and local culture³⁹. The United States and the United Kingdom are both highly individualistic societies, meaning that personal privacy and liberty of any individual is given a prioritized position in relation to other social norms and core principles⁴⁰. On one hand it could mean that individuals in the UK would accept widening the use of transmission x-ray scanners for certain applications such as prisons. That is based on close cultural distance between two countries. The product is currently extremely popular within US correctional institutions and there does not appear to be resistance to the use of such equipment in

³⁴ P. Chhanabhai, A. Holt, Consumers Are Ready to Accept the Transition to Online and Electronic Records If They Can Be Assured of the Security Measures. *Medscape General Medicine*, 9, 2007, pp. 8-27.

³⁵ T. Levitt, *The Marketing Imagination*. New York: Free Press 1983.

³⁶ M. De Mooij, G. Hofstede, Convergence and divergence in consumer behavior: implications for international retailing, *Journal of Retailing* 78, 2002, pp. 61-69.

³⁷ M. Evans, A. Jamal, G. Foxall, *Consumer Behaviour*. 2nd ed., Chichester: John Wiley and Sons Ltd. 2009.

³⁸ C. Smith, P. Meiksins, System, Society and Dominance Effects in Cross-National Organisational Analysis, *Work, Employment and Society* 9, 1995, pp. 241-267.

³⁹ N. Basabe, M. Ros, Cultural dimensions and social behaviour correlates: Individualism-Collectivism and Power Distance, *International Review of Social Psychology* 18, 2005, pp. 189-225.

⁴⁰ The Hofstede Centre, 2013. *United Kingdom in Comparison with the United States* [Online] Available at: <http://geert-hofstede.com/united-kingdom.html> [Accessed 8th February 2017].

this context (Fox21News, 2012)⁴¹. On the other hand, the high value placed on individualism both in the US and the UK suggests that individual privacy and liberty are core values for and one must, therefore, consider privacy as one of the major influences of people's perceptions with regards to widening the use of transmission x-ray full body scanners. It is clearly important to analyze how individuals react to the potential wider applications of a product and if their feeling towards the technology would change due to potential associated privacy issues.

Moreover, neither the United States, nor the United Kingdom currently use the product for general public screening and it is consequently unknown how individuals would react to the potential introduction of the product into the transport security sector. In addition, there is no direct evidence to suggest that introducing Compass full body scanners into UK correctional facilities would generate public backlash as Hofstede Centre's (2013)⁴² country culture comparison is rather generalized and does not relate to a certain product or service.

Jamal⁴³ argued that the multi-cultural nature of British society contributes to an homogenisation of consumer tastes and preferences through interaction between marketers and consumers, as well as internal interaction between different consumer groups. Nevertheless, it is important not to ignore the multi-cultural nature of British society in relation to widening the use of transmission x-ray full body scanners⁴⁴. Whilst Jamal's argument is valid, there is evidence of intra-state cultural diversity that would potentially influence public perceptions in relation to certain products or services. Da Silveira and Crubelatte⁴⁵ argued that values and cultural features of different ethnic groups within one country produce different effects and cannot be ignored by businesses operating within that specific state. This is especially pertinent when discussing issues of individual privacy, as it could be seen as a particularly sensitive issue, the view of which would change depending on the country of application. Thus, it could be argued that different cultural groups must participate in the research in order to ensure higher levels of representation, as well as producing better results for analysis. The next subsection will discuss the utility of the security equipment and the importance of the individual product analysis for data accuracy and data relevance.

Effect of Product Usefulness on Customer Perceptions

The utility of security equipment is another issue that determines public perception of this technology. A study conducted by Garcia⁴⁶ examined public perceptions regarding security technologies, such as: cameras, and entry control

⁴¹ Fox21News, 2012. *Jail eliminates strip search, inmates now get full body scan* [Online], Available at: <http://www.fox21news.com/news/video.aspx?list=194968&id=757646> [Accessed 25th February 2017].

⁴² The Hofstede Centre, 2013. *United Kingdom in Comparison with the United States* [Online], Available at: <http://geert-hofstede.com/united-kingdom.html> [Accessed 8th February 2017].

⁴³ A. Jamal, 2001. Marketing in a multicultural world: The interplay of marketing, ethnicity and Consumption. *European Journal of Marketing* 37, pp. 1599-1620.

⁴⁴ Guardian, 2005. *Multicultural Britain: Diversity, not Segregation* [Online], Available at: <http://www.guardian.co.uk/uk/2005/jan/21/britishidentity.islamandbritain> [Accessed 22nd February 2017].

⁴⁵ R.A. Da Silveira, J. Crubelatte, The notion of Brazilian organizational culture: Questionable generalizations and vague concepts, *Critical Perspectives on International Business* 3, 2007, pp. 150-169.

⁴⁶ C. Garcia, School Safety Technology in America: Current Use and Perceived Effectiveness, *Criminal Justice Policy Review* 14, 2003, pp. 30-54.

systems within schools of the United States. The results demonstrated that most respondents viewed cameras, recording systems and weapon detectors as being effective security measures. Entry control systems and duress alarms were, however, viewed as being ineffective security precautions. It could be argued then that the type of security technology plays a major role in establishing its usefulness and in determining the attitudes of citizens. Separated product analysis and the avoidance of grouping different products into clusters would produce more accurate results and will be more useful for decision makers when establishing new product applications. Moreover, comparing usefulness of the product with current security measures both within the prison sector and the transport security sector could determine the value of security gains from widening the use of transmission x-ray full body scanners.

Conclusion

Based on the above discussion and analysis, It has been established that the equipment will benefit governmental agencies in battling the problem of illegal contraband both within the prison and transport security sectors in the UK and that privacy versus security debate will remain central in relation to it. Moreover, consistent with the literature, the equipment will be able to improve privacy of air transport travellers and inmates. On the other hand, it was established that the product would be rather impractical for the use on the UK's rail network. One could argue that the aims of this article were achieved and it lays a foundation for further research in the field of widening the use of transmission x-ray full body scanners.

Bibliography

- Adani Systems, *ConPass Checkpoint: Personnel Security Screening System* [Online], Available at: http://security.adanisystems.com/en/catalog/personal_inspection/adani_conpass/ [Accessed 24th February 2017].
- Aquilina K., Public Security Versus Privacy in Technology Law: A balancing act? *Computer Law and Security Review* 26, 2010, pp. 130-143.
- Basabe N., Ros M., Cultural dimensions and social behavior correlates: Individualism-Collectivism and Power Distance. *International Review of Social Psychology* 18, 2005.
- Blum M., 1977. *Psychology and Customer Affairs*. New York: Harper and Row Publishers.
- British Broadcasting Corporation, 2011. *US warns airlines of threat of 'implanted bombs'* [Online], Available at: <http://www.bbc.co.uk/news/world-us-canada-14061884> [Accessed 21st March 2017].
- Burkart G., When Privacy Goes Public: New Media and the Transformation of the Culture of Confession. In: H. Blatterer, P. Johnson and M. Markus, eds. 2010. *Modern Privacy: Shifting Boundaries, New Forums*. Basingstoke: Palgrave MacMillan.

- Chhanabhai P., Holt A., Consumers Are Ready to Accept the Transition to Online and Electronic Records If They Can Be Assured of the Security Measures. *Medscape General Medicine*, 9, 2007.
- Da Silveira R.A., Crubelatte J., 2007. The notion of Brazilian organizational culture: Questionable generalizations and vague concepts. *Critical Perspectives on International Business* 3.
- De Mooij M., Hofstede G., Convergence and divergence in consumer behavior: implications for international retailing. *Journal of Retailing* 78, 2002.
- The Economist, 2013. *X no longer marks the spot* [Online], Available at: <http://www.economist.com/blogs/gulliver/2013/01/airport-security-body-scanners> [Accessed 12th March 2017].
- European Monitoring Centre for Drugs and Drug Addiction, 2013. *Table GPS-1. Lifetime prevalence of drug use by age and country, most recent national general population survey available since 2000* [Online], Available at: <http://www.emcdda.europa.eu/stats13#display:/stats13/gpstab1b> [Accessed 24th February 2017].
- Evans M., Jamal A. and Foxall G., 2009. *Consumer Behaviour*. 2nd ed. Chichester: John Wiley and Sons Ltd 2009.
- Financial Times, 2009. *Dutch to use body scanners for US flights* [Online], Available at: <http://www.ft.com/cms/s/0/51461dd0-f54a-11de-90ab-00144feab49a.html#axzz2NLCr2Qib> [Accessed 12th March 2017].
- Foxall G., *Consumer Behaviour: A Practical Guide*. Newcastle-Upon-Tyne: University of Newcastle-Upon-Tyne 1997.
- Fox News, 2011. *Cook County Jail Unveils New Body Scanners for Processing Prisoners* [Online], Available at: <http://www.myfoxchicago.com/story/17800336/cook-county-jail-unveils-new-body-scanners-for-processing-prisoners> [Accessed 12th March 2017].
- Fox21News, 2012. *Jail eliminates strip search, inmates now get full body scan* [Online], Available at: <http://www.fox21news.com/news/video.aspx?list=194968&id=757646> [Accessed 25th March 2017].
- Garcia C., School Safety Technology in America: Current Use and Perceived Effectiveness. *Criminal Justice Policy Review* 14, 2003.
- Guardian, 2005. *Multicultural Britain: Diversity, not Segregation* [Online], Available at: <http://www.guardian.co.uk/uk/2005/jan/21/britishidentity.islamandbritain> [Accessed 22nd February 2017].
- Harris D., Superman's X-Ray Vision and the Fourth Amendment: the New Gun Detection Technology. *Temple Law Review* 69, 1996.
- HM Inspectorate of Prisons, HM Chief Inspector of Prisons for England and Wales: Annual Report 2011–2012 [Online], Available at: <http://www.justice.gov.uk/downloads/publications/corporate-reports/hmi-prisons/hm-inspectorate-prisons-annual-report-2011-12.pdf> [Accessed 25th February 2017].
- HM Revenue and Customs, 2013. *Drug Smuggling* [Online], Available at: http://customs.hmrc.gov.uk/channelsPortalWebApp/channelsPortalWebApp.portal?_nfpb=true&_pageLabel=pagePractitionerZone_ShowContent&propertyType=document&featurearticle=true&id=HMCE_CL_001327#P19_1663 [Accessed 24th February 2017].

- The Hofstede Centre, 2013. *United Kingdom in Comparison with the United States* [Online], Available at: <http://geert-hofstede.com/united-kingdom.html> [Accessed 8th February 2017].
- Jamal A., Marketing in a multicultural world: The interplay of marketing, ethnicity and Consumption. *European Journal of Marketing* 37, 2001.
- Kilou D., Backscatter body scanners – A strip search by other means. *Computer Law and Security Report* 24, 2008.
- OECD, 2005. *Glossary of Statistical Terms: Product Innovation* [Online], Available at: <http://stats.oecd.org/glossary/detail.asp?ID=6868> [Accessed 20th February 2017].
- Lavine M., The Early Clinical X-Ray in the United States: Patient Experiences and Public Perceptions. *Journal of the History of Medicine and Allied Sciences* 67, 2012.
- Levitt T., *The Marketing Imagination*. New York: Free Press 1983.
- Lyster S., 2017. *Transmission X-Ray Technology and its applications*. [Telephone Interview] (Personal Communication, 6 March 2017).
- Mironenko O., Body scanners versus privacy and data protection. *Computer Law Security Review* 27, 2011.
- Murphy M. and Wilds, M., 2001. X-Rated X-ray Invades Privacy Rights. *Criminal Justice Policy Review* 12.
- Nacos B., Bloch-Elkon Y. and Shapiro R., Prevention of Terrorism in Post-9/11 America: News Coverage, Public Perceptions, and the Politics of Homeland Security, *Terrorism and Political Violence* 20, 2008.
- Phelps J., Nowak G., Ferrell E., Privacy Concerns and Consumer Willingness to Provide Personal Information, *Journal of Public Policy and Marketing* 19, 2000.
- Ram S., Sheth J., Consumer resistance to innovations: the marketing problem and its solutions, *Journal of Consumer Marketing* 6, 1989.
- Smith C., Meiksins P., System, Society and Dominance Effects in Cross-National Organisational Analysis *Work, Employment and Society* 9, 1995.
- Statt D., *Understanding the Customer: A Psychological Approach*, Basingstoke: MacMillan Press Ltd.1997.
- Szmigin I., *Understanding the Consumer*. London: Sage Publications Ltd. 2003.
- Transparency International UK, 2013. *Corruption in Prisons* [Online], Available at: <http://www.transparency.org.uk/our-work/corruption-in-the-uk/prisons> [Accessed 25th February 2017].
- UK Parliament, 2012. *Drugs in Prisons* [Online], Available at: <http://www.publications.parliament.uk/pa/cm201213/cmselect/cmhaff/184/18409.htm> [Accessed 25th February 2017].
- UK Parliament, 2013. *Parliament and Government* [Online], Available at: <http://www.parliament.uk/about/how/role/parliament-government/> [Accessed 27th February 2017].