WHO IS THE POTENTIAL MICROCHIP IMPLANT USER?

MARYNA VOVK,[1] ALENKA BAGGIA,[2] VANJA BEVANDA,[3] LUKASZ ZAKONNIK,[4] DARIA MALTSEVA,[5] STANISLAV MOISSEV,[5] ANTONÍN PAVLÍČEK,[6] JAKUB FISCHER,[7] MACIEJ ROSTAŃSKI,[8] ANJA ŽNIDARŠIČ[2] IN BORUT WERBER[2]

[1] National Technical University "Kharkiv Polytechnic Institute", Kharkiv, Ukraine.ž
E-mail: maryna.vovk@khpi.edu.ua
[2] University of Maribor, Faculty of organizational sciences, Kranj, Slovenia.
E-mail: borut.werber@um.si, alenka.baggia@um.si, anja.znidarsic@um.si
[3] Juraj Dobrila University of Pula, Faculty of Economics and Tourism "Dr. Mijo Mirković", Pula, Croatia.
E-mail: vanja.bevanda@unipu.hr
[4] Department of Computer Science in Economics, University of Łódź: Łódź, Poland.
E-mail: lukasz.zakonnik@uni.lodz.pl
[5] HSE University: Moscow, Russia.
E-Mail: dmaltseva@hse.ru, spmoiseev@gmail.com
[6] Department of Informatics and Analytical Methods at University College of Business in Prague, Czech Republic.
E-Mail: antonin.pavlicek@vse.cz
[7] Faculty of Informatics and Statistics of the Prague University of Economics and Business, , Czech Republic.
E-Mail: jakub.fischer@vse.cz
[8] Faculty of Computer Science, Academy of Business in Dabrowa Gornicza, Dąbrowa Górnicza, Poland.
E-Mail: mrostanski@gmail.com

Abstract The passive radio frequency identification microchip implants are known to be a subject of intense debate and argument about their advantages and disadvantages. While one group sees the opportunities of microchip implants in healthcare and the positive impact on life, the other group emphasizes a variety of issues related to privacy, impact on the human body, and others. Given recent changes in lifestyle and other areas, it is reasonable to assume that microchip implants are an inevitable part of our future. The purpose of this study was to determine the characteristics and habits of potential future users. Using a sample of survey participants from four European countries, we conducted a cross-sectional study. The regression model was used to test our research question, which aimed to identify predictors of willingness to use microchip implants. The results show that the potential microchip implant user is male, has multiple social media profiles, and has a history of losing wallets, keys, or ID cards. He uses online shopping and group purchases and has a number of loyalty cards. According to the sample results, age is not a significant predictor of microchip implant use.

Keywords:: microchip implant, RFID, Future user, regression model, technology acceptance.

University of Maribor Press

DOI https://doi.org/10.18690/um.fov.3.2022.75
ISBN 978-961-286-583-2

1 Introduction

Technological advances and lifestyle changes have significantly altered our habits in recent decades. We use wearable devices (Morozova & Gurova, 2021), prefer online shopping to visiting stores, are active on social media, and have other daily habits that were not even possible a few years ago. As a result of changing lifestyles, promotional activities and the organization of services have also changed significantly. Retailers, for example, use a variety of strategies to engage and satisfy their online and offline customers (Hult et al., 2019).

Nowadays, Near Field Communication (NFC) cards are mainly used for shopping, but are increasingly installed on mobile (smartphone) or wearable (smartwatch) devices. Some researchers suggest that this technology could be further developed and microchip implants could also be used for shopping (Michael et al., 2017). In addition to shopping, smart home access, or healthcare identification, MI can simplify many everyday tasks (Gauttier, 2019; Graveling et al., 2018).

Radio frequency identification (RFID) technology has been evolving for decades. From tags used for tracking in industry to microchips in glass tubes used to identify pets and stray animals (Landaluce et al., 2020). Since the first attempt to implant a microchip in 1998, microchips implants (MI) have occasionally been used in humans (Fram et al., 2020), mainly for healthcare applications (Bauer, 2007; Farra et al., 2012; Venkat et al., 2019). To date, MIs have been used by individuals (Ip et al., 2008), for entertainment (Michael & Michael, 2010), or in organizations (Rodriguez, 2019).

RFID tags can be passive, i.e., without power, or active, i.e., self-powered, in most cases by batteries. In general, passive RFID tags can be divided into low frequency (LF), high frequency (HF), or ultra-high frequency (UHF). HF NFC RFID tags are based on two-way communication and are suitable for transmitting data at high speed over short distances. MIs on the market today can use passive LF RFID, HF RFID, NFC HF RFID or various combinations of these technologies. Each combination enables different levels of storage, protection, and security (Cui et al., 2019).

Despite medical considerations for the use of MI in animals and humans (Albrecht, 2010), recent research has rejected some of the possible theories. Graveling et al. (2018) demonstrated that migration of MI in the body is no longer an issue. Fram et al. (2020) proved that MIs in magnetic resonance imaging are safe and can even be used to treat cancer cells (Lai et al., 2016). In addition to medical considerations, safety issues related to MIs have also improved in recent years (Masyuk, 2019).

According to the research presented, from a technological perspective, MIs are ready to be widely deployed for daily use. Nevertheless, the general perception of MIs is not positive. The aim of this study is to identify the profile of the person who would be willing to use MI. The research was conducted in four countries. In this research, the potential use of the passive NFC HF RFID MIs is analyzed. These MIs are 2 x 12 mm or smaller, they cannot be tracked by GPS systems and can be used for identification.

1.1 Brief history of the use of microchip implants in humans

In 1998, Professor Kevin Warwick successfully used an MI implanted in his arm to open doors and turn on lights (Michael & Michael, 2013). In 2004, the use of MI in humans was approved by the U.S. Food and Drug Administration (FDA) (Rotter et al., 2008). Around this time, the first hobbyist, Amal Graafstra, implanted an MI in his arm. He used the MI to gain access to the office, enter the house, unlock the car, and log into the computer (Ip et al., 2008). In 2016, Dutch traveler Andreas Sjoestroem became the first person to use an MI for personal airline information to pass through pre-flight security at Stockholm Arlanda Airport (Morris, 2016).

In recent years there have been a few reports on the use of MIs for employees. A Belgian technology and marketing company enabled their employees to use MI to gain access to the building and computer system (Rodriguez, 2019). A Swedish company recently enabled its employees to carry their COVID-19 vaccination passport in an MI (Teh, 2021).

1.2 Applications of microchip implants

Four main application areas of MI can be derived from the literature: Healthcare, Identification, Purchasing, and Everyday Use. MI can be used to store patient personal information, medical treatments and conditions, allergies, prescribed medications, or other vital information needed to treat the patient (Fram et al., 2020; Gillenson, 2019; Rotter et al., 2008). MI can also store personal identification data (Rotter et al., 2008), or provide access to restricted areas (e.g., military buildings). Due to their temperature resistance, MIs have been used to identify the deceased in the event of a natural disaster (Meyer et al., 2006). Similar to personal identification, MIs can also be used for entertainment or shopping purposes. The first reported case of an entertainment event where payment and VIP access were based on MIs was described by Michael & Michael (2010). As in the cases of the first hobby users of MIs (Ip et al., 2008; Michael & Michael, 2013), MIs can be used to unlock doors, access computers, phones, start the car engine or other devices (Rotter et al., 2008). MIs could be integrated into smart home systems to open blinds, control heating, control lights, or the like (Cui et al., 2019; Landaluce et al., 2020).

1.3 Limitations on the use of microchip implants

In addition to the generally negative perception of technological innovation, the MI technology is met with even more radical rejection. According to Mohamed (2020), some people view this technology as a "mark of the beast". Looking beyond these radical views it is clear from the literature that there are many concerns associated with the use of MI (Komkaite et al., 2019). First, there are the legal issues. Despite FDA approval (Rotter et al., 2008) and the EU study on the use of microchip implants for workers (Graveling et al., 2018), there are no specific laws on the use of MI and human rights. Second, ethical issues (European Commission, 2005) of the use of MI can be addressed. Based on human dignity, privacy, equality, nondiscrimination , and other aspects, the ethical considerations are complex and broad (Graveling et al., 2018).

Third, health risk seems to be the most exposed issue when considering implantation of MI, which makes people even more uncertain about using MI (Rotter et al., 2008). Several studies have addressed health issues related to the use of MI, but in contrast to studies confirming the actual health risk (e.g., malignant tumors) (Albrecht, 2010),

a recent study shows, that MI could be used for medical treatment (e.g., cancer) (Lai et al., 2016).

The fourth problem with the use of MI concerns security. While man-in-the-middle attacks were possible in the initial solutions of MI, various measures have been taken to improve the technology (Huo, 2014). To overcome known security issues, new solutions have been proposed using different protocols (Gasson & Koops, 2013; Guo et al., 2014)

2 Methodology

The cross-sectional study presented in this paper was conducted in 2016 and 2017 in four European countries: The Czech Republic, Poland, Croatia, and Slovenia. The survey was adapted from a previous study on the acceptance of MI (Werber et al., 2018). Our aim was to investigate participants' willingness to accept MI, their online activities and sociodemographic characteristics.

Fifteen factors related to human characteristics and habits were grouped into four categories: Online activities, loss history, personal characteristics, and purchasing habits. Participants were asked for what purpose they would use MI (healthcare, identification, purchase, or everyday use. The following research question was defined:

RQ: What factors influence the number of different uses of microchip implants?

Detailed descriptions of individual factors are presented in Table 1. A multiple regression model was used to answer the research question. The backward method procedure led to the final model results.

3 Results

The final dataset of the study contained 1058 surveys. As shown in Figure 1, we captured almost equal proportion of participants by gender. About a quarter (25.3%) of respondents were from Poland, 13.3% from Croatia, 33.6% from the Czech Republic, and 27.2% from Slovenia. The majority of respondents were employed (61.9%), whereas just over a quarter (27.1%) were students.

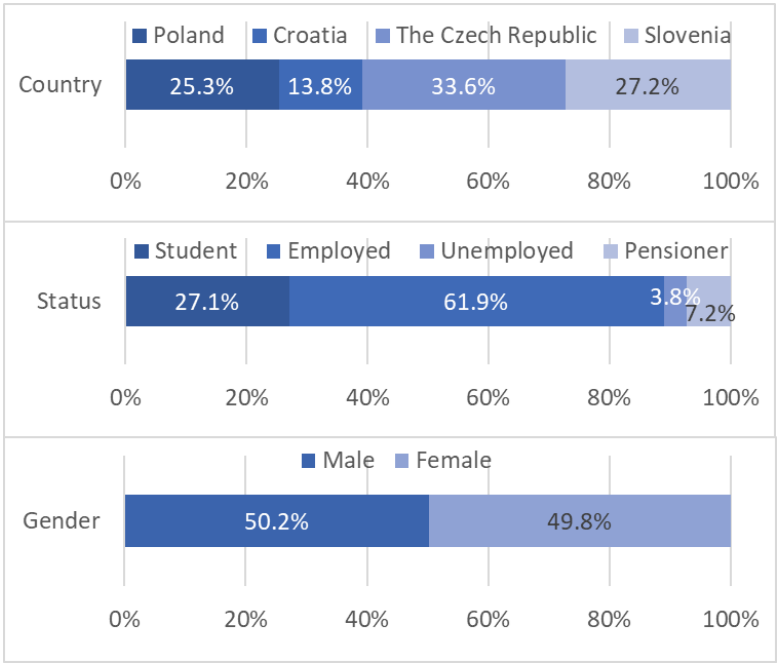

Figure 1: Characteristics of respondents by gender, status, and country

The willingness to use MIs for different purposes was analyzed. Respondents were asked whether they would use MI for various purposes in healthcare, identification, purchase or everyday use. The highest percentage of respondents (Figure 2) willing to use MIs for purchase was in Croatia (22.6%), followed by Poland and the Czech Republic (22.1%), and the lowest in Slovenia (19.7%). In all countries, the percentage of respondents willing to use MI for healthcare purposes is more than twice as high as for purchase (42.3%, 51,0%, 56.9% and 48.9% respectively). The percentages for everyday domestic use are slightly higher than for purchase, while the percentages for identification purposes range from 27.4% in Slovenia to 36.5% in Croatia.

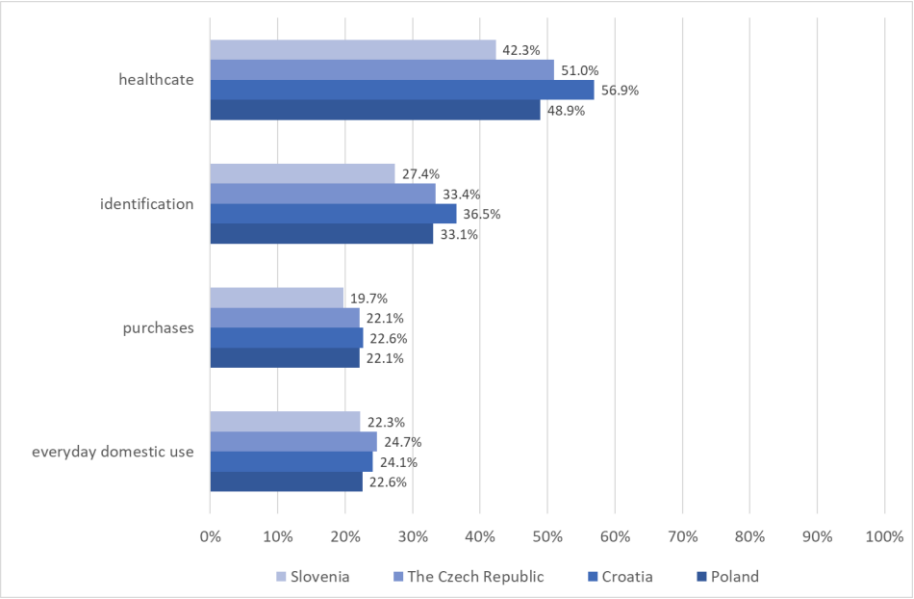

Figure 2: Percentage of different microchip implant use across countries

Percentages of respondents who would use a MIs for all four purposes (presented above), none of them or 1 to 3 selected purposes were calculated About 15% of respondents would use a MI for all purposes. The highest percentage of respondents who would not use a MI is in Slovenia (53.6%), and the lowest (40.1%) in Croatia (Figure 3). The average number of different MI uses is $1.27\ (SD = 1.50)$ in Poland, $1.40\ (SD = 1.49)$ in Croatia, $1.32\ (SD = 1.50)$ in the Czech Republic, and $1.12\ (SD = 1.48)$ in Slovenia. The distributions of the number of different MI uses are similar in all four countries. In general, the average number of different MI uses is $1.26\ (SD = 1.49)$.

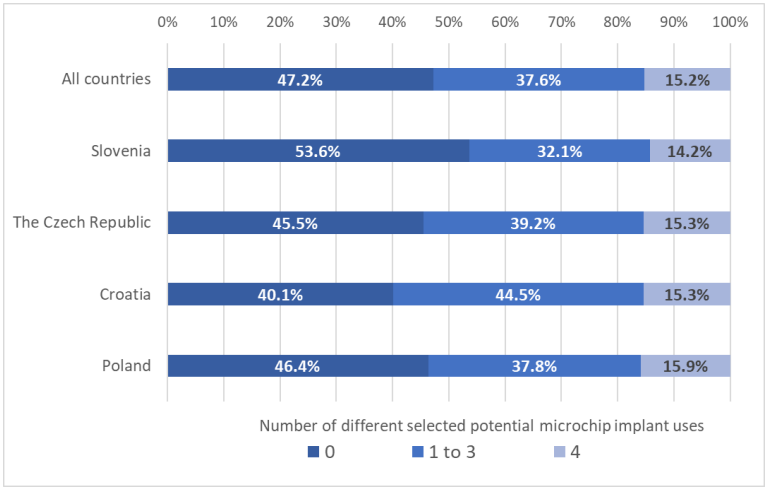

Figure 3: Percentage of different microchip implant uses across countries.

Multiple regression was used to answer the research question. 15 predictors (Table 1) were used to predict the number of potential MIS uses.

Table 1: Variables with scales in the initial regression model and their descriptive statistics

Variable description	**Scale**	***N***	***M***	*SD*
Age	*Numeric*	105	36.3	14.3
Number of e-mail addresses: private and business	*0 to 5,* *6 – '6 or more'*	102 2	2.93	1.40
Number of social media profiles: Facebook, LinkedIn, Twitter, Instagram, Google+, Snapchat, Pinterest	*0 to 7*	101 4	2.44	1.76
Frequency of posting and commenting on social media	*0 – 'never (or no SM profile)',* *1 – 'monthly or less',* *2 – 'weekly',* *3 – 'daily',* *4 – 'several times per day',* *5 – 'several times per hour'*	961	1.73	1.25
Frequency of checking and reading on social media		976	2.68	1.50
Number of losses of keys in the last 5 years	*0 – 'never',* *1 – '1- time',* *2 – '2-times',* *3 – '3-times',* *4 – 'more than 3 times'*	101 1	0.34	0.78
Number of losses of wallet, identity documents or credit cards in the last 5 years		102 4	0.27	0.59
Frequency of online purchases	*0 – 'never',* *1 – 'sometimes or several times a year',* *2 – 'regularly or at least once a month'*	105 7	1.24	0.66
Number of debit cards	*0, 1, 2, 3,* *4 – 'more than 3'*	105	1.42	0.90
Number of credit cards		104	0.76	0.88
Number of prepaid cards		104	0.38	0.71
Number of loyalty cards	*0 to 29, 30 – '30 or more'*	102	5.24	5.74
Percentage of purchases paid with credit cards	*0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100*	103 4	55.8 3	31.4 0
Number of participations in group purchase	*0 to 9, 10 – '10 or more'*	913	0.97	2.02

In the backward regression, eight out of 15 predictors were sequentially omitted due to insignificant impact. We omitted number of debit cards, frequency of posts on social media (SM), age, number of prepaid cards, number of email addresses, number of credit card purchases, number of credit cards and frequency of checking SM. The final regression model with seven significant predictors fits the data well (ANOVA ($\boldsymbol{F = 14.199}$, $\boldsymbol{df1 = 7}$, $\boldsymbol{df2 = 702}$, $\boldsymbol{p = 0.000}$)), details are omitted due to paper length limitations.

In Figure 4, the remaining 7 significant predictors are presented. The largest influence on the number of different MI uses has the number of SM profiles ($\beta = 0.172$). Gender has the second largest influence ($\beta = -0.139$), with females having on average less MI uses than males. Other factors influencing the number of MI uses include the two factors indicating lost keys and wallets, and the three factors indicating purchase habits (frequency of online purchases, number of loyalty cards, and participation in group purchase).

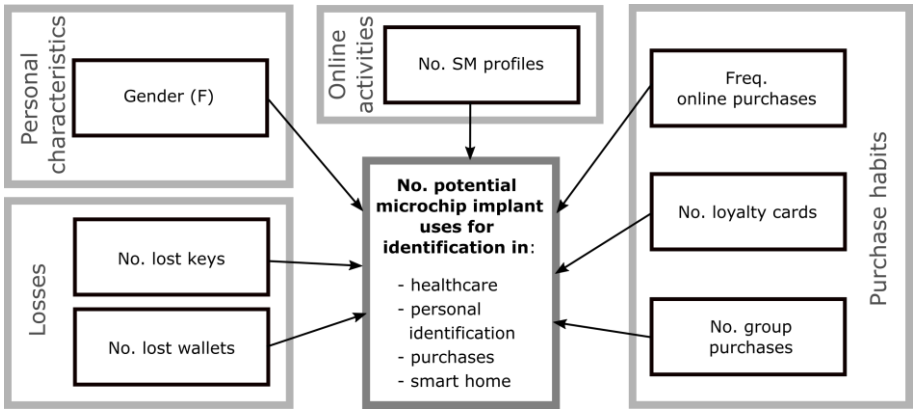

Figure 4: Factors affecting the number of different microchip implant uses

4 Conclusion

According to Michael et al. (2017), some people are willing to accept microchip implants, e.g., for electronic payments. However, acceptance of the technology depends on an individual's awareness, knowledge, fears, and goals. In this study, we aimed to find out what factors related to people's habits influence their decision about possible use of MI. Four countries were included in the study. In all four

countries, the lowest percentage of respondents would use MI for purchase, while the highest percentage of respondents would use MI for medical purposes. Due to the strong influence of the Roman Catholic Church in Poland (Borowik, 2017) and Croatia (Hazdovac Bajić, 2020), we expected different opinions about MIs in these countries. Surprisingly the results did not confirm that the willingness to use MI is significantly different. Moreover, the results even show a higher willingness to use MI for healthcare and identification purposes in Croatia. Willingness to use MIs for purchase or daily household use was more or less similar in all countries studied. In general, we can conclude that among the countries studied, Slovenians are the least willing to use MI for various purposes.

To investigate our research question about the factors influencing the number of different uses of MI, we defined categories of factors related to online behavior and habits of individuals. The regression model was built using the backward method to identify the significant predictors. We found that the most significant predictor of willingness to use MI was the number of profiles in social networks, followed by gender and lost keys. Accordingly, a potential user of MI has a high number of profiles in social networks, is more likely to be male, and has a history of lost keys. A less significant predictor is the loss of wallets, identity documents, or credit cards. Opportunities for MIs in the online shopping environment, group purchases and loyalty programs are also more likely to influence willingness to use MIs.

Based on these findings, we can describe a profile of the MI user. The potential MI user is male, has more social network profiles, and has a history of losing keys, wallets, or IDs. He is also experienced in online shopping, has participated in group purchases, and tends to collect loyalty cards. Based on his habits, you could say that his life is more stressful than calm.

The results of this study have shown that when it comes to their health, people are more willing to use new, sometimes unfamiliar technologies. We are currently experiencing a similar situation with the Covid-19 vaccine, which has received widespread general approval despite its short clinical trial period and unexplored side effects (Cyranoski, 2020). In the near future, we plan to adapt the survey and repeat the study on a larger sample, expanding the EU area, to gain insight into possible differences in attitudes between different religions, nationalities, and other groups.

Acknowledgements

The Slovenian Research Agency (ARRS) partly supported this work (Research program "Decision support systems in electronic commerce", program No.: P5-0018).

References

Albrecht, K. (2010). Microchip-induced tumors in laboratory rodents and dogs: A review of the literature 1990-2006. *2010 IEEE International Symposium on Technology and Society*, 337–349. https://doi.org/10.1109/ISTAS.2010.5514622

Bauer, K. A. (2007). Wired Patients: Implantable Microchips and Biosensors in Patient Care. *Cambridge Quarterly of Healthcare Ethics*, *16*(03), 281–290. https://doi.org/10.1017/S0963180107070314

Borowik, I. (2017). Religion, Politics, and Social Attitudes in Transforming Poland: A Conclusion. In S. Ramet & I. Borowik (Eds.), *Religion, Politics, and Values in Poland*. Palgrave Macmillan. https://doi.org/10.1057/978-1-137-43751-8_14

Cui, L., Zhang, Z., Gao, N., & Meng, Z. (2019). Radio Frequency Identification and Sensing Techniques and Their Applications — A Review of the State-of-the-Art. *Sensors (Switzerland)*, *19*(18), 4012.

Cyranoski, D. (2020). Why emergency COVID-vaccine approvals pose a dilemma for scientists. *Nature*, *588*, 18–19.

European Commission, E. G. on E. in S. and N. T. (2005). *Opinion on the ethical aspects of ICT implants in the human body*. https://op.europa.eu/en/publication-detail/-/publication/92bdd8a2-77fe-486b-8b83-d3dc1e34d29f/language-en/format-PDF/source-77404434

Farra, R., Sheppard, N. F., McCabe, L., Neer, R. M., Anderson, J. M., Santini, J. T., Cima, M. J., & Langer, R. (2012). First-in-Human Testing of a Wirelessly Controlled Drug Delivery Microchip. *Science Translational Medicine*, *4*(122), 122ra21. https://doi.org/10.1126/scitranslmed.3003276

Fram, B. R., Rivlin, M., & Beredjiklian, P. K. (2020). On Emerging Technology: What to Know When Your Patient Has a Microchip in His Hand. *The Journal of Hand Surgery*, 1–5. https://doi.org/10.1016/j.jhsa.2020.01.008

Gasson, M. N., & Koops, B.-J. (2013). Attacking Human Implants: A New Generation of Cybercrime. *Law, Innovation & Technology*, *5*(2), 248–277. https://doi.org/10.5235/17579961.5.2.248

Gauttier, S. (2019). 'I' ve got you under my skin' – the role of ethical consideration in the (non-) acceptance of insideables in the workplace. *Technology in Society*, *56*, 93–108. https://doi.org/10.1016/j.techsoc.2018.09.008

Gillenson, M. L. (2019). I' ve got you under my skin: the past, present, and future use of RFID technology in people and animals. *Journal of Information Technology Management*, *XXX*(2), 19–29.

Graveling, R., Winski, T., & Dixon, K. (2018). The use of chip implants for workers. In *Study for the EMPL Committee*. http://www.europarl.europa.eu/studies

Guo, C., Zhang, Z., Zhu, L., Tan, Y., & Yang, Z. (2014). A novel secure group RFID authentication protocol. *The Journal of China Universities of Posts and Telecommunications*, *21*(1), 94–103. https://doi.org/10.1016/S1005-8885(14)60274-0

Hazdovac Bajić, N. (2020). Representation of Non-Religious and Atheistic Identities in a Highly Religious Society - Croatian Case. *Occasional Papers on Religion in Eastern Europe*, *40*(1), 6. https://digitalcommons.georgefox.edu/ree/vol40/iss1/6

Hult, G. T. M., Sharma, P. N., Morgeson, F. V., & Zhang, Y. (2019). Antecedents and Consequences

of Customer Satisfaction: Do They Differ Across Online and Offline Purchases? *Journal of Retailing*, *95*(1), 10–23. https://doi.org/10.1016/j.jretai.2018.10.003

Huo, F. (2014). Aspects of RFID Securities. In X. Fan (Ed.), *Radio-Frequency Identification (RFID): Emerging Technologies, Applications and Improvement Strategies* (pp. 93–118). Nova Science Pub Inc.

Ip, R., Michael, K., & Michael, M. G. (2008). Amal Graafstra- The Do-It-Yourselfer RFID Implantee: The culture, values and ethics of hobbyist implantees. *Cultural Attitudes Towards Technology and Communication (CATAC08)*, 1–15. https://ro.uow.edu.au/infopapers/582/

Komkaite, A., Lavrinovica, L., Vraka, M., & Skov, M. (2019). Underneath the Skin: An Analysis of YouTube Videos to Understand Insertable Device Interaction. In *CHI '19: Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*. https://doi.org/10.1145/3290605.3300444

Lai, H. C., Chan, H. W., & Singh, N. P. (2016). Effects of radiation from a radiofrequency identification (RFID) microchip on human cancer cells. *International Journal of Radiation Biology*, *92*(3), 156–161. https://doi.org/10.3109/09553002.2016.1135264

Landaluce, H., Arjona, L., Perallos, A., Falcone, F., Angulo, I., & Muralter, F. (2020). A review of IoT sensing applications and challenges using RFID and wireless sensor networks. *Sensors (Switzerland)*, *20*(9), 1–18. https://doi.org/10.3390/s20092495

Masyuk, M. A. (2019). Information security of RFID and NFC technologies. *Journal of Physics: Conference Series*, *1399*(3), 033093. https://doi.org/10.1088/1742-6596/1399/3/033093

Meyer, H. J., Chansue, N., & Monticelli, F. (2006). Implantation of radio frequency identification device (RFID) microchip in disaster victim identification (DVI). *Forensic Science International*, *157*(2–3), 168–171. https://doi.org/10.1016/j.forsciint.2005.10.001

Michael, K., Aloudat, A., Michael, M. G., & Perakslis, C. (2017). You Want to do What with RFID? Perceptions of radio-frequency identification implants for employee identification in the workplace. *IEEE Consumer Electronics Magazine*, *6*(3), 111–117. https://doi.org/10.1109/MCE.2017.2684978

Michael, K., & Michael, M. G. (2013). The future prospects of embedded microchips in humans as unique identifiers: the risks versus the rewards. *Media, Culture & Society*, *35*(1), 78–86. https://doi.org/10.1177/0163443712464561

Michael, K., & Michael, M. G. (2010). The diffusion of RFID implants for access control and epayments: A case study on Baja Beach Club in Barcelona. *IEEE International Symposium on Technology and Society*, 242–252. https://doi.org/10.1109/ISTAS.2010.5514631

Mohamed, M. A. (2020). Modeling of Subcutaneous Implantable Microchip Intention of Use. In T. Ahram, W. Karwowski, A. Vergnano, F. Leali, & R. Taiar (Eds.), *Intelligent Human Systems Integration 2020* (pp. 842–847). Springer International Publishing. https://doi.org//10.1007/978-3-030-39512-4_128

Morozova, D., & Gurova, O. (2021). Being like others versus being different: wearable technology and daily practices of 50+ consumers in Finland and Russia. *International Journal of Consumer Studies*, *00*, 1–22.

Morris, H. (2016). Microchip implanted in man's hand allows him to pass through airport security. In *Traveller*. https://www.traveller.com.au/microchip-implanted-in-mans-hand-allows-him-to-pass-through-airport-security-gm8xgu

Rodriguez, D. A. (2019). Chipping in at work: Privacy concerns related to the use of body microchip ("RFID") implants in the employer-employee context. *Iowa Law Review*, *104*(3), 1581–1611. https://ilr.law.uiowa.edu/assets/Uploads/ILR-104-3-Rodriguez.pdf

Rotter, P., Daskala, B., & Compano, R. (2008). RFID implants: Opportunities and and challenges for identifying people. *IEEE Technology and Society Magazine*, *27*(2), 24–32.

https://doi.org/10.1109/mts.2008.924862

Teh, C. (2021, December 23). A Swedish company has created a microchip that allows users to carry their COVID vaccine passport under their skin. *Insider*. https://www.insider.com/swedish-firm-under-skin-microchip-for-covid-19-passes-2021-12

Venkat, R., Adchaya, A., Muthukumar, B., & Manipal, S. (2019). In-Vitro Study to Check the Viability of Fixed Partial Dentures with Built-in Passive RFIDs- A Forensic Dentistry Tool. *Journal of Clinical and Diagnostic Research*, *13*(10), 8–13. https://doi.org/10.7860/jcdr/2019/42412.13186

Werber, B., Baggia, A., & Žnidaršič, A. (2018). Factors Affecting the Intentions to Use RFID Subcutaneous Microchip Implants for Healthcare Purposes. *Organizacija*, *51*(2), 121–133. https://doi.org/10.2478/orga-2018-0010