An In-Depth View on the Role of Irrational Opposition in Wearable Health Tracker Adoption in Corporate Wellness Programs

Nima Molavi
University of Toledo

Suvankar Ghosh
University of Toledo

James Y. Strebler
University of Toledo

This paper extends the UTAUT 2 by adding the concept of irrational opposition to the adoption of a wearable health tracker in a corporate wellness setting. Our proposed model incorporates all of the UTAUT 2 constructs and adds the idea of irrational opposition. UTAUT 2's emphasis is more on the drivers of rational intention to adopt consumer technology. However, not all human behavior is rational. We develop a new theoretical model integrating both rational and irrational drivers of behavior. We also develop and validate an instrument for testing this model and provide recommendations on reducing the element of irrational opposition.

Keywords: healthcare management, UTAUT 2, Consumer technology adoption, Irrational opposition, health trackers

INTRODUCTION

Corporations seek to improve worker health due to the high cost of medical care for workers. Past research has shown that corporate health promotion programs tend to reduce insurance and healthcare costs (Fries et. al 1994, Golaszaewski et al. 1992, Pelletier 1991). Because of this, corporate wellness programs are common in many large corporations. Forward-looking companies are adopting a variety of strategies to get health care costs under control including taking a holistic approach to health care (McCann 2016). One potential avenue for leveraging innovative technology is the use of wearable health trackers by employees (Mewborn, 2017). These trackers can provide a variety of information about the status of the subject's health such as heart rate, blood pressure, calories used, and the quality of sleep. This feedback from the health tracker enables the subject to focus on actions to improve their health (Caggiano 2019). The subject may share this information with their primary care physician as they develop together a plan to restore the subject's health.

The adoption of these health trackers may enhance the effectiveness of the corporation's wellness program. However, participation in wellness programs and using health trackers are usually voluntary.

This paper seeks to identify factors that contribute to the adoption of health trackers. Conversely, this may provide insight into obstacles to adoption.

Since the Unified Theory of Acceptance and Use of Technology (UTAUT) 2 is a general model of consumer technology adoption, our theoretical model for health tracker adoption is based on the UTAUT 2 (Venkatesh, Thong, and Xu, 2012). The UTAUT 2 is the last iteration of a stream of technology acceptance models (TAM) starting from TAM 1 (Davis, 1989; Davis, Bagozzi, and Warshaw, 1989) to TAM 2 (Venkatesh and Davis, 2000; Venkatesh and Morris, 2000) to UTAUT 1 (Venkatesh, Morris, Davis, and Davis, 2003), and finally UTAUT 2 (Venkatesh et al, 2012). The TAM genre of research models is generally viewed as falling in the *economic-rationalistic* school of thought on the drivers of the technology acceptance phenomenon (Fichman, 2004). This is because the TAM genre places great emphasis on factors such as the usefulness and ease-of-use of the technology, which are rationalistic in nature. However, Fichman (2004) and others have called for going beyond the dominant paradigm, which is rationalistic at its core, in examining the phenomenon of adopting new technology.

In general, there is also an irrational element to human decisions and actions. People smoke cigarettes despite widespread knowledge that it is injurious to health. The Prototype/Willingness Model has been offered as a theory for explaining risky behavior (Gerrard, Gibbons, Houlihan, Stock, and Pomery, 2008; Rivis, Sheeran, and Armitage, 2006). Our concept of "irrational opposition" as a factor in the adoption of wearable health trackers is based on the Prototype/Willingness Model.

In addition to the theoretical innovation of developing a model that incorporates both rational and irrational drivers of the adoption of wearable health trackers, we also answer another long-standing call in the information systems (IS) discipline to make IS research more practitioner-relevant (Benbasat and Zmud, 1999; Davenport and Markus, 1999). Given that the rising cost of healthcare is a universal societal concern, we felt it appropriate to focus our holistic theoretical model on this vexing issue of healthcare costs.

In addition to developing a new model of technology adoption focused on innovative healthcare technology, we also develop and validate an instrument to support our theoretical model. In developing this instrument, we have been mindful of the issue of common methods variance (CMV) that has plagued previous TAM studies (Sharma**,** Yetton, and Crawford, 2009; Straub and Burton-Jones, 2007).

This paper seeks to:

- Go beyond the dominant paradigm of technology acceptance research, which at its core is largely economic-rationalistic in nature, in developing a model for health tracker adoption
- Identify the facets of irrational opposition to health tracker adoption
- Develop and validate a complete instrument to test our theoretical model with due consideration given to the CMV issue.
- Provide theory-based recommendations on engendering the use of health trackers by employees

The rest of this paper is organized as follows: In Section 2, we review several streams of theory related to the focus of this paper on wearable health tracker adoption. In Section 3, we formulate the research model and the hypotheses. In Section 4, we describe the methodology for building the instrument for testing our theoretical model is described. In Section 5, we describe the next stage of this research. In Section 6, we discuss the managerial implications with regard to mitigating the element of irrational opposition to adopting health trackers. Lastly, Section 6 concludes this paper.

LITERATURE REVIEW

In this section, key theories and models related to the adoption of health trackers as well as irrational opposition behavior are reviewed including (1) technology acceptance models, (2) theories related to irrational opposition, and (3) the adoption of wearable health trackers.

Technology Acceptance Models

Technology acceptance studies is a major field of interest among IS researchers. Studies in this stream examine the drivers of the adoption of novel IT artifacts. Since health trackers are indeed one of the most novel IT artifacts, it is appropriate to investigate their adoption through the lens of technology acceptance models.

The theory of technology adoption has evolved over the last several decades with the first fundamental model, the TAM 1, being proposed in 1989 (Davis, 1989; Davis et al., 1989). In TAM 1, which was based on the Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975), the two main antecedents for predicting IT adoption are perceived usefulness (PU) and perceived ease of use (PEOU). PU and PEOU predict behavioral intention, which directly influences actual behavior.

After the introduction of TAM 1, researchers aimed to increase the predictability of the model or fit the model into new contexts (Compeau and Higgins, 1995; Taylor and Todd, 1995). Given these objectives, new constructs were added to TAM, such as the ability of a person to use the new IT as well as social pressures, or subjective norms that influence the adoption of a new IT. These new antecedents draw support from the Theory of Planned Behavior (TPB) (Ajzen, 1991) and Social Cognitive Theory (SCT) (Bandura, 1977, 1986). This led to the development of TAM 2 which added subjective norms, voluntariness, and image as social influence constructs, accompanied by job relevance, output quality, and results' demonstrability as cognitive instrumental process constructs (Venkatesh and Davis, 2000; Venkatesh and Morris, 2000).

In a seminal article, Venkatesh et al. (2003) combined the constructs of several theories of social behavior and technology acceptance including the TRA (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975) TPB (Ajzen, 1991), SCT (Bandura, 1977, 1986), and innovation diffusion theory (IDT) (Rogers, 1983) into a unified theory called the Unified Theory of Acceptance and Use of Technology (UTAUT). The UTAUT identifies performance expectancy, effort expectancy, social influence, and facilitating conditions as the key drivers of the intention to adopt an IT artifact. The UTAUT also includes four moderators: gender, age, experience, and voluntariness. The moderators draw support from earlier studies of IT adoption based on the TAM 2 (Venkatesh and Morris, 2000).

Venkatesh et al. (2012) extended the UTAUT model and developed UTAUT 2 addressing technology adoption in the consumer context. Hedonic motivation (Holbrook and Hirschman, 1982), price value (Zeithaml, 1988) and habit (Limayem, Hirt, and Cheung, 2007) were added to this model in order to fit the UTAUT to the consumer context. Additionally, voluntariness of use is also eliminated as it was not relevant anymore. UTAUT 2 is a solid foundation for this research as health trackers are belonging to the consumer context. The TAM and its variants have also been used to study adoption of new technology in the health services industry such as physician adoption of telemedicine technology (Hu, Chau, Sheng, and Tam, 1999), consumer adoption of mobile health services (Zhao, Ni, and Zho, 2018), physician adoption of electronic health records (Hossain, Quaresma, and Rahman, 2019), and RFID subcutaneous microchip implants (Werber, Baggia, and Žnidaršič, 2018). Consequently, the adoption of wearable health trackers was based on the TAM, in particular on the UTAUT 2.

Irrational Opposition

Most of the aforementioned studies are highly focused on behavioral intention. Of course, the centrality of behavioral intention in these studies of technology adoption implies that there should be an instrument for accurately measuring intention. This means that all drivers of intention, both rational and irrational, should be considered in the formation of intention, which we have endeavored to do in our theoretical model of adoption of health trackers.

Another question that arises is whether intention fully predicts actual behavior. Warshaw and Davis (1985) argued that behavioral intention and actual behavior should be disentangled. They posited that expectations about the outcomes from a certain behavior can also be used to complement behavioral intention in predicting the actual behavior. Webb and Sheeran (2006) also found in their meta-analysis of whether changing behavioral intention engenders behavioral change that this link is not always consistent.

The Auto-Motive Model argues that behavior can be the unconscious pursuit of certain goals which could simply be triggered by external stimuli (Bargh, 1990; Gollwitzer and Bargh, 2005). There is automaticity to certain behaviors, which results in the performance of such behavior without conscious intention. The UTAUT 2 incorporates the automaticity of behavior in the habit construct (Venkatesh et al., 2012), which is supported by the studies done by Limayem et al. (2007) and Kim and Malhotra (2005).

Hedonic motivation or enjoyment that comes from certain behavior could also be a driver for the performance of that behavior (Holbrook and Hirschman, 1982), even though that behavior may not be strictly rational, such as smoking a cigarette, when the harmful long-term impact on health is considered. The Prototype/Willingness Model provides a theoretical framework for understanding such behavior (Gerrard et al., 2008; Rivis et al., 2006). The model posits that there are actually two pathways that lead to behavior. One of them is reasoned and analytic path where one consciously weighs the pros and cons of the behavior and considers the outcomes, both short- and long-term. This path draws support from theories of behavior such as the TRA and TBP (Ajzen, 1991; Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975). The other is the heuristic path which is not based on a rational, systematic and time-consuming analysis of the pros and cons and short- and long-term consequences of the behavior. This is the willingness path to engage in certain behaviors, which could be risky. Rivis et al. (2006) view the Prototype/Willingness Model as an extension of the TPB.

The Prototype/Willingness Model has been used in various other health care contexts such as risky behavior exhibited by adolescents in smoking, drinking, and unsafe sex (Rivis et al., 2006), seeking counseling and psychological help (Hammer and Vogel, 2013), and the impact of parenting in shaping risk cognitions in adolescents (Cleveland, Gibbons, Gerrard, Pomery, and Brody, 2005).

Consider the scenario of an employee smoking cigarettes and drinking coffee while on a break: The employee may do this during their mid-afternoon break because they have always done so (habit), they enjoy smoking (hedonic motivation), they find that it charges their batteries to do the work they have to do for the remainder of the day (goal pursuit), and they are willing to ignore the risks of this behavior (willingness). In this scenario, it can be argued that habit, hedonic motivation, and goal attainment are all precursors of their willingness to smoke cigarettes and drink coffee during their mid-afternoon break ignoring the deleterious long-term effects on their health of nicotine and caffeine.

This paper tries to measure all of these mechanisms that result in certain behavior using a new construct called irrational opposition. This construct refers to all of the decisions made by humans that are not based on solid logic or in a rational way.

Adoption of Wearable Health Trackers

Wearable health trackers are referring to the electronic devices being worn by individuals and are able to track health measures, such as heartbeat, blood pressure, or oxygen saturation. Smartwatches and Fitbit are great examples of wearable health trackers that are commonly being used nowadays.

In one of the earliest studies focusing on the adoption of wearable health trackers (WHTs), Nasir and Yurder (2015) investigated the perceptions of users and physicians about WHTs. TAM model has been used and extended by adding perceived risk and compatibility constructs, in order to fit the context. However, this study did not provide any empirical support for the proposed hypotheses and the WHT acceptance model.

In another similar work, Lunney, Cunningham, and Eastin (2016) tried to blend TAM with TPB model in order to develop a framework for the context of wearable fitness technologies adoption. They used structural equation modeling (SEM) technique in order to test their hypotheses. Based on the results, they claimed that wearable fitness technologies use is significantly related to the perceived health outcomes of these devices. As one of the suggestions for future research, they have indicated that there is a need to focus on motivation, as well as habit formation through goal setting.

Zhang et al. (2017) aimed to explore factors that influence the WHTs adoption intention. They considered technical attributes, health attributes, and consumer attributes. They have also used TAM model and integrated it with the health belief model, snob effect and conformity and reference group theory. The results suggested that the adoption of WHTs is being influenced by all of the three considered

attributes simultaneously, namely, technical, health, and consumer. Authors have also suggested paying more attention to the special groups of people who may have different characteristics in their intention to use WHTs.

Lee and Lee (2018) examined the factors influencing an individual's intention to adopt a WHT. Considered factors in this research are interpersonal influence, personal innovativeness, and self-efficacy, attitudes toward a wearable fitness tracker, health interests, and perceived expensiveness of the device. The subjects of this research were students who are highly different from the subjects of our paper who are employees of a firm. Based on a logistic regression analysis, it is observed that consumer attitudes, personal innovativeness, and health interests had a significant and positive impact on the intention of WHT adoption. Moreover, they have compared two groups of subjects who differed in the knowledge about the WHTs and observed that intention to adopt was stronger among those who were aware of WHTs than among those who were not aware.

Finally, in one of the most recent studies, Shin et al. (2019) conducted a systematic literature review on the topic wearable activity trackers and categorized the research into six major themes which are as follows:

- Acceptance, adoption, and abandonment
- Behavior Change
- Patient treatment and medical settings
- Technology focus
- Self-monitoring data centered
- Privacy

Based on the analysis of 78 articles in the acceptance, adoption, and abandonment theme. Authors suggest that this theme of research is bridging "Technology" and "Users" which is identical to other technology acceptance contexts. They have argued that WHTs are highly complex devices which are needed to be understood comprehensively from various perspectives. In this regard, the authors called for interdisciplinary awareness about the current landscape of WHTs use.

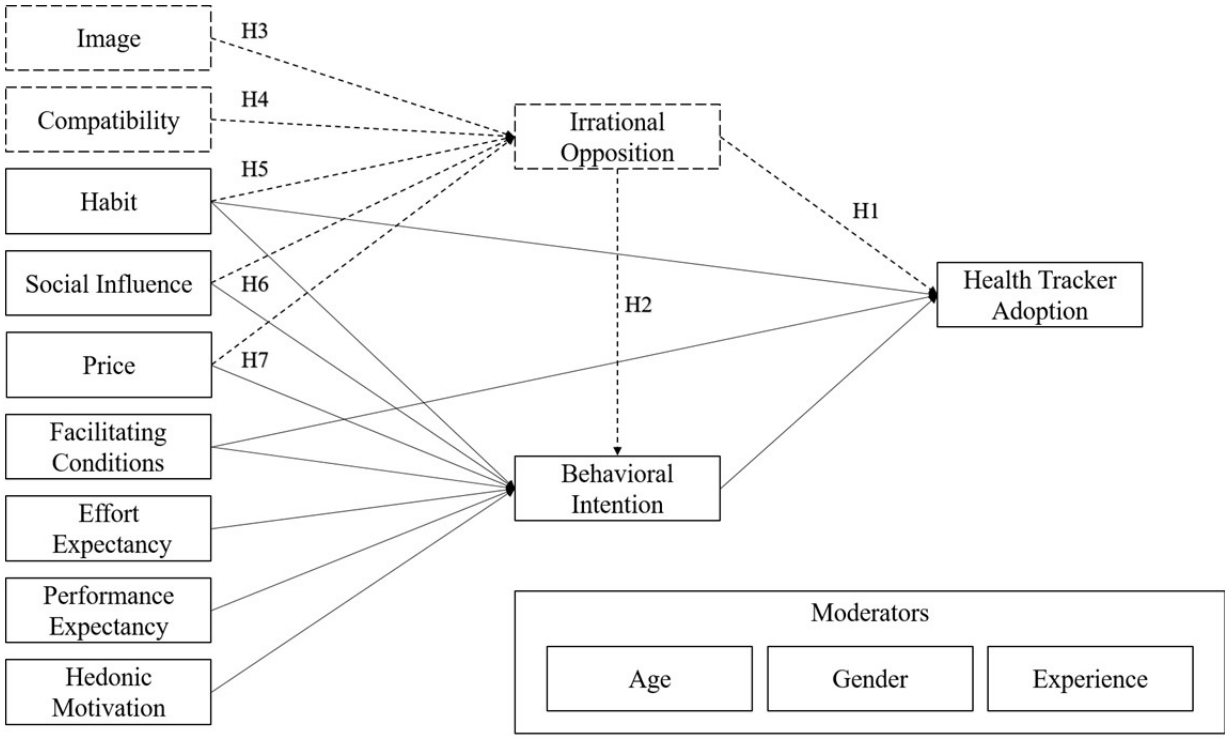
RESEARCH MODEL AND HYPOTHESIS DEVELOPMENT

This paper adds an irrational opposition construct to the UTAUT 2 in order to increase the predictive power of the model in the health tracker context. We explore the drivers of irrational opposition and the rational and irrational paths to the behavior of health tracker adoption. The position of the irrational opposition construct in the larger nomological network of constructs embracing both the rational and irrational elements in decision-making and behavior with regard to health tracker adoption is analyzed.

The model is based primarily on the established UTAUT2 model (Venkatesh, 2012). We have also added image and compatibility based on Moore and Benbasat, 1991. The additional construct of irrational opposition is based on the concept of behavioral willingness from Gerrard et al. (2008). The purpose of adding irrationality to the UTAUT 2 model is to attempt to increase the explanatory power of the model. It is notable that, to keep the research model simple, the impact of moderator factors on the relationship are not drawn.

The first hypothesis of this paper is related to the main idea of this paper: the impact of irrational opposition on use behavior. Based on the Prototype/Willingness Model and Auto-Motive Model, which are reviewed in the previous section, the behavior of decision-makers is not always rational. The reason for their behavior could have roots in their irrationality. Moreover, as the irrational opposition is always some type of resistance to a specific behavior, therefore in our study, it has a destructive effect on the adoption of wearable health trackers. Consequently, the first hypothesis of this paper is developed as follows:

FIGURE 1
RESEARCH MODEL



Hypothesis 1: *Irrational opposition is negatively associated with the adoption of wearable health trackers.*

On the other hand, irrational opposition can decrease the intention to adopt wearable health tracker. The impact of irrational opposition on use behavior can be felt both directly as well as be mediated through behavioral intention. In some cases, the irrational opposition may fundamentally decrease the intention of doing something which is rationally reasonable. This hypothesis is also consistent with the Prototype/Willingness Model.

Hypothesis 2: *Irrational opposition is negatively associated with the intention to adopt wearable health trackers.*

The next five developed hypotheses are related to the antecedents of irrational opposition. The first antecedent is image which came from the paper of Moore and Benbasat (1991). In our paper, the image is defined as the perceptions of subjects about a person who uses a health tracker. Some people may think that if someone uses health trackers it means that he or she is not healthy enough or even unattractive. However, some other people may think that if a person uses health tracker he is smart and attractive. This image of a person who uses a health tracker will influence the irrational opposition. In this condition, their inappropriate thoughts about the user of health trackers may form an opposition to use wearable health trackers.

Hypothesis 3: *Image of people about a person who uses health tracker risk is negatively related to irrational opposition.*

The next hypothesis is related to the compatibility of health trackers with people's jobs and lifestyles. For instance, if a person greatly uses his or her hands during work, the health trackers which should be worn around the wrist will not be compatible with the job. Hence, if using wearable health trackers are not compatible with people's lifestyle or job, they will immediately reject using that. Individuals do not want to use those health trackers because they prefer their lifestyle or routine over tracking their health condition. This opposition is not reasonable because in many cases people can slightly change their lifestyle, and change how they do their job or even how they use health trackers and satisfy the requirements of both. In this regard, if wearable health tracker does not seem compatible with the individuals' lifestyle or routine tasks, they may exhibit irrational opposition to use health trackers.

Hypothesis 4: *Compatibility of wearable health tracker with individual's lifestyle or job is negatively associated with irrational opposition.*

In addition to the influence of added constructs on irrational opposition, the original UTAUT2 constructs may also have impact on the irrational opposition. We hypothesized that Habit, Social Influence, Price may also influence the irrational opposition. In many studies using the Prototype/Willingness Model, it is proved that social influence will form the willingness of a behavior that could be in contrast with their actual intention. Habit can also be influential on irrational opposition. For instance, consider a person who has not worn any watch or bracelet at all. This person does not want to use wearable health trackers because his habit is in sharp contrast with the adoption of these devices. Price can also lead to the formation of irrational opposition. Individuals may initially get disappointed by the price of a product without understanding and considering its real potential and benefits. If the knowledge of a person about wearable health trackers and their potential benefits is limited, then their high price may raise an irrational opposition to adopt them. Based on the above discussion, the final hypotheses of this paper are developed as follows:

Hypotheses 5: *Social influence is negatively related to irrational opposition.*

Hypotheses 6: *Habit is negatively related to irrational opposition.*

Hypotheses 7: *Price is negatively related to irrational opposition.*

METHODOLOGY

The questions used to measure the UTAUT 2 constructs were adopted directly from the questions used in the UTAUT 2 model. However, the construct of irrational opposition is new to this model. Because of this, new measurement questions were developed according to the methodology described below This approach of iteratively building the instrument using cards with the survey questions against a pilot group is essentially a variant of the methodology used by Moore and Benbasat (1991) in developing and validating an instrument for the theory developed by Rogers (1983) on the diffusion of innovations.

Fifteen new questions were developed and printed on 3x5 cards. Raters were given the cards and asked to categorize them according to which construct they belonged to. The raters consisted of one current research faculty member and two Ph.D. program students. On the first pass, the correlation of questions to the desired construct was poor with only 28.89% of questions correctly being categorized.

For the second pass, new, established constructs were added and the phrasing of the new questions was changed to reduce ambiguity and bring the phrasing more in line with affirmative statements. On the second pass, 88.89% of the questions were categorized with the appropriate construct. This percentage of correctly categorized questions was acceptable.

Next, of the questions relating to the new construct, they were ordered from best to worst, in order to reduce the number of final questions to four. In order to facilitate this task, the authors provided the raters

with four general conceptual facets to be measured for the construct. Each rater then selected the question that they felt was the best question in order to represent the conceptual area.

The four conceptual facets were: avoidance of beneficial activities, avoidance of information, resentment of company and social perception or image.

After the raters ordered the questions, a winner for each conceptual facet was selected, resulting in a total of four questions to measure the constructs. The UTAUT 2 questions and the four new questions are to be administered via a survey using Survey Monkey. The subjects will be selected by queries to a number of companies.

The issue of common methods variance (CMV) that has plagued past research in the application of the TAM/UTAUT genre of technology adoption models has been considered in the development of this instrument (Straub & Burtion-Jones, 2007; Sharma et al., 2009). Data on both objective measures of usage of health trackers as well as subjective measures of intent to use such trackers will be collected in a bid to reduce the CMV problem. Furthermore, the survey will be administered in two formats: 1) the dependent variable of behavioral intention will be the first question and will precede the main block of questions on the antecedents to intention, and 2) the dependent variable of behavioral intention will be the last question following the block of questions on antecedents to intention. In the path model, a dummy variable will be introduced as an additional antecedent for behavioral intention with the value 0 for the first and 1 for the second format. In either format, the question on actual usage will be randomly placed in the main block of questions on the antecedents. Each recipient will be randomly assigned a survey with an equal probability of getting either format 0 or 1. Each recipient will also likely see a different position of the actual usage question as that will be randomly assigned a position in the main black of antecedents.

Future Work

As it is explained in the previous section, this paper will use survey as the methodology to test the hypotheses. In this regard, the next step of this research will be data collection. To collect the data, the population is identified as all of the employees in the United States. The number of firms should be selected from the companies who are willing to initiate health programs in the near future or have already implemented these programs.

Afterward, first, a pilot test can be done with a small random sample of the employees within one firm to test the validity and wording of the questionnaire. The wording of questionnaire will be revised after the pilot test and then the survey will be distributed through survey monkey to the entire sample for the final phase.

In the next step, the collected data will be cleaned and used to test the developed hypotheses. Based on the results of hypotheses testing, the possible explanation for the results will be investigated and explained in order to provide insights into the topic.

MANAGERIAL IMPLICATIONS

In this section, the managerial implications of this paper are discussed. One of the objectives of this research is to provide insights for healthcare managers and help them identify practices that can enhance the adoption of health trackers. If the results support the hypotheses, a number of suggestions are proposed that can be used to reduce the negative impact of irrational opposition to health tracker adoption. These results-contingent suggestions are discussed below:

Since past research has shown that corporate health promotion programs tend to reduce insurance and healthcare costs (Fries et. al 1994, Golaszewski et al. 1992, Pelletier 1991), companies should emphasize the value of the health tracker and clarify its benefits in comparison with the price. It should be shown that the price of a health tracker is reasonable considering the benefits from them. Some financial incentives could also be offered to defray a portion of the costs of a health tracker. Mid-range health trackers and smartwatches can cost anywhere in the range of $75 to $300. Samsung's Galaxy Watch Active 2 has a retail price of $250 (Samsung, n.d.). Lower-end products are also available such as FitBit's Inspire HR™ costs $100 (FitBit, n.d.). When it comes to consumer technology, previous studies have

established that perceived monetary value (PMV) is indeed a key factor in the purchase decision by consumers, which is why PMV is included as a driver of behavioral intention in the UTAUT 2 (Venkatesh et al., 2012). Other studies on consumer technology adoption which preceded the UTAUT 2, such as the study done by Hong and Tam (2006) on the adoption of mobile devices such as smartphones and personal digital assistants (PDA), also found that PMV directly influences the behavioral intention to adopt new consumer technology.

The positive effects of offering financial incentives to employees were found in the 12th Annual Willis Towers Watson/Business Group on Health (Wojcik, 2007), Willis Towers Watson is a business consulting firm with healthcare as one of its major practices (Willis Watson Towers, n.d.). The Business Group on Health is a non-profit organization that advocates on healthcare policies for large employers (Business Group on Heath, n.d.).

The second possible way to reduce irrational opposition could be by promoting the image of health tracker users. This can be achieved through advertisements, flyers, banners, and campaigns. The main idea is to show that the individuals who adopt health trackers are smart, popular, and cool. From the perspective of technology adoption theories, image is included in TAM 2 as a driver of intention to adopt an IT, albeit indirectly through the usefulness construct (Venkatesh and Davis, 2000). Image is also included in the instrument developed by Moore and Benbasat (1991) as a driver of the adoption of IT innovations. It should be noted that the promotion of health trackers needs the commitment of senior and junior managers. They should use health trackers during their work to show to the employees that even their managers and supervisors are using these products. This ties into social influence in the UTAUT (Venkatesh et al., 2003) or the subjective norms in the TAM 2 (Venkatesh and Davis, 2000) as a driver of behavioral intention. In TAM 2, the influence of subjective norms on behavioral intention is felt both directly as well as indirectly via the usefulness construct. By implementing our suggestions on improving the image of people wearing health trackers, the irrational opposition to their use may be reduced.

In order to further reduce irrational opposition, companies can study the existing work processes and tasks within the company and, if it is possible, modify them to be compatible with the adoption of health trackers. By doing that, employees initially see the compatibility of their work processes with health tracker adoption and the probability of their opposition due to the insubstantial compatibility issue will be reduced.

Lastly, companies can also help in changing employees' habits. Habit is the automaticity of behavior (Limayem et al., 2007; Kim and Malhotra, 2005), which can result from prolonged use and familiarity with the IT that results from such use. When a habit of using the IT forms, then a conscious behavioral intention becomes less instrumental in using that IT. More broadly, in psychology research, a habit formed as a result of past behavior has been shown to influence the continuance of that behavior (Ouellette and Wood 1998). Management should thus try to incentivize the formation of a habit to use health trackers. They can allocate incentives for first month's use of health trackers in order to make health tracker usage into a habit. Employees initially may adopt the health tracker to receive the participation incentives, but after a while, using health trackers may be turning into a habit for them. For instance, if employees adopt smartwatches, they can get used to other features of smartwatches and therefore continue using them permanently.

CONCLUSION

Wearable health trackers are one of the most influential and novel ITs that are capable of improving humans' health substantially. In recent years, companies have tried to utilize health trackers and combine them with health reward programs, in order to increase enhance the health condition of their employees. However, it is not clear to what extent employees are willing to participate in health programs and adopt health trackers. In this regard, this paper expanded the unified theory of acceptance and use of technology (UTAUT 2) in order to fit the model to health tracker contexts.

This study proposes a theoretical model for the adoption of wearable health trackers as part of a corporate wellness program. A new construct called irrational opposition is introduced which can prevent

the wider adoption of wearable health trackers. Moreover, image and compatibility constructs were added to the model, which are identified in previous studies. It is hypothesized that image, compatibility, social influence, habit, and price may be antecedents of irrational opposition.

To be able to test the hypotheses, a measurement instrument is needed for each construct. As the irrational opposition is a new construct, a preliminary instrument is developed and validated using the Q-sort methodology. For all other constructs, items were collected from previous studies and reworded to fit the context. The next step of this study will be a pilot test to refine the instrument. Afterward, a large-scale survey will be conducted to measure each construct using developed and validated instruments to test the hypotheses.

To conclude, this is a theoretically innovative and highly managerially relevant article. We address the call by Fichman for going beyond the dominant paradigm of research in the adoption of IT innovations. We do this by including drivers, such as irrational opposition, that expand the traditional economic-rationalistic logic of innovative IT adoption. Furthermore, we do this in the context of one of the most important issues of the day, which is about bringing runaway health care costs under control. We have built a conceptual model and validated an instrument for testing the hypotheses in our model for adopting wearable health trackers. This is a technology that holds much promise in getting runaway health care and health insurance costs under control in the long-term.

REFERENCES

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior.*

Bandura, A. (1977*).* Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191–215

Bandura, A. (1986). *Social foundations of thought and action*. Englewood Hills, NJ, Prentice-Hall.

Bargh, J. A. (1990). Goal and intent: Goal-directed thought and behavior are often unintentional. *Psychological Inquiry*, 1(3), 248-251.

Benbasat, I., & Zmud, R. W. (1999). Empirical research in information systems: The practice of relevance. *MIS Quarterly*, 23(1), 3-16.

Business Group on Health (n.d.) Our organization. Retrieved February 2, 2020, from https://www.businessgrouphealth.org/who-we-are/our-organization

Caggiano, l. (2019, December-January). More than steps toward well-being: Health professionals use mobile apps**,** Wearable tech to help people lead better lives. *Northwest Indiana Business Quarterly Magazine*, 28-31.

Casselman, J., Onopa, N., & Khansa, L. (2017). Wearable healthcare: Lessons from the past and a peek into the future. *Telematics and Informatics*, 34(7), 1011-1023.

Cleveland, M. J., Gibbons, F. X., Gerrard, M., Pomery, E. A., & Brody, G. H. (2005). The Impact of Parenting on Risk Cognitions and Risk Behavior: A Study of Mediation and Moderation in a Panel of African American Adolescents. *Child Development*, 76(4), 900-916.

Compeau, D. R, & Higgins, C. A. (1995). Application of social cognitive theory to training for computer skills. *Information Systems Research*, 6(2), 118-143.

Davenport, T. H., & Markus, M. L. (1999). Rigor vs. relevance revisited: Response to Benbasat and Zmud. *MIS Quarterly*, 23(1), 19-23.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 319-340.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989) User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35(8), 982-1003.

Fichman, R. G. (2004). Going Beyond the Dominant Paradigm for Information Technology Innovation Research: Emerging Concepts and Methods. *Journal of the Association for Information Systems*, 5(8), 314-355.

Fisbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. Massachusetts, Addison-Wiley Publishing Company.
FitBit. (n.d.). *Trackers*. Retrieved February 16, 2020, from https://www.fitbit.com/us/products/trackers
Fries, J. F., Harrington, H., Edwards, R., Kent, L. A., &Richardson, N. (1994). Randomized controlled trial of cost reductions from a health education program: The California public employees' retirement system (PERS) study. *American Journal of Health Promotion*, 8, 216–223.
Gerrard, M., Gibbons, F. X., Houlihan, A. E., Stock, M. L., & Pomery, E. A. (2008). A dual-process approach to health risk decision making: The prototype willingness model. *Developmental Review*, 28(1), 29-61.
Gollwitzer, P. M., & Bargh, J. A. (2005). *Automaticity in goal pursuit* (pp. 624-646).
Golaszewski, T., Snow, D., Lynch, L.Y., & Solomita, D. (1992). A benefit-to-cost analysis of a work-site health promotion program. *Journal of Occupational Medicine*, 34, 1164–1172.
Hammer, J.H., & Vogel, D.L. (2013). Assessing the utility of the willingness/prototype model in predicting help-seeking decisions. *Journal of Counseling Psychology*, 60(1), 83-97.
Holbrook, M. B., & Hirschman, E.C. (1982) The experiential aspects of consumption: Consumer fantasies, feelings, and fun. *Journal of Consumer Research*, 9(2), 132-140.
Hong, S-J., & Tam, K.Y. (2006). Understanding the adoption of multipurpose appliances: The case of mobile data services. *Information Systems Research*, 17(2), 169-179.
Hossain, A., Quaresma, R., & Rahman, H. (2019, February). Investigating factors influencing the physicians' adoption of electronic health record (EHR) in healthcare system of Bangladesh: An empirical study. *International Journal of Information Management*, 44, 76-87.
Hu, P. J., Chau, P. Y., Sheng, O. R. L., & Tam, K. Y. (1999). Examining the technology acceptance model using physician acceptance of telemedicine technology. *Journal of Management Information Systems*, 16(2), 91-112.
Kim, S. S., & Malhotra, N. K. (2005). A longitudinal model of continued IS use: An integrative view of four mechanisms underlying post-adoption phenomena. *Management Science*, 51(5), 741-755.
Lee, S. Y., & Lee, K. (2018). Factors that influence an individual's intention to adopt a wearable healthcare device: The case of a wearable fitness tracker. *Technological Forecasting and Social Change*, 129, 154-163.
Limayem, M., Hirt, S. G., & Cheung, C.M.K. (2007). How habit limits the predictive power of intentions: The case of IS continuance, *MIS Quarterly*, 31(4), 705-737.
Lunney, A., Cunningham, N. R., & Eastin, M. S. (2016). Wearable fitness technology: A structural investigation into acceptance and perceived fitness outcomes. *Computers in Human Behavior*, 65, 114-120.
McCann, D. (2016, June). New cures for health costs. *CFO*, 43-45.
Mewborn, A. (2017). Health, care and wearable technologies. *ISE: Industrial & Systems Engineering at Work*, 49(3), 22-22.
Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research*, 2(3), 192-222.
Nasir, S., & Yurder, Y. (2015). Consumers' and physicians' perceptions about high tech wearable health products. *Procedia-Social and Behavioral Sciences*, 195, 1261-1267.
Ouellette, J. A., & Wood, W. (1998). Habit and intention in everyday life: The multiple processes by which past behavior predicts future behavior. *Psychological Bulletin*, 124(1), 54-74.
Pelletier, K. A (1991). A review and analysis of the health and cost-effective outcome studies of comprehensive health promotion and disease prevention programs. *American Journal of Health Promotion*, 5(4), 311–315.
Rivis, A., Sheeran, P. Armitage, C. J. (2006). Augmenting the theory of planned behaviour with the prototype/willingness model: Predictive validity of actor versus abstainer prototypes for adolescents' health-protective and health-risk intentions. *British Journal of Health Psychology*, 11(3), 483-500.
Rogers, E.M. (1983). *Diffusion of innovations* (3rd edition). New York, The Fee Press.

Samsung. (n.d.). *Wearables*. Retrieved February 10, 2020 from https://www.samsung.com/us/smartwatches-and-fitness-bands/buy/s/Model/

Sharma, R., Yetton, P., & Crawford, J. (2009). Estimating the effect of common method variance: The method--method pair technique with an illustration from tam research. *MIS Quarterly*, 33(3), 473-A13.

Shin, G., Jarrahi, M. H., Fei, Y., Karami, A., Gafinowitz, N., Byun, A., & Lu, X. (2019). Wearable Activity Trackers, Accuracy, Adoption, Acceptance and Health Impact: A Systematic Literature Review. *Journal of Biomedical Informatics*, 103153.

Straub, D., & Burton-Jones, A. (2007). Veni, vidi, vici: Breaking the TAM logjam. *Journal of the Association for Information Systems*, 8(4), 224-229.

Taylor, S., & Todd, P. (1995). Assessing IT usage: The role of prior experience. *MIS Quarterly*, 561-570.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 186-204.

Venkatesh, V., & Morris, M. G. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS Quarterly*, 115-139.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 425-478.

Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1), 157-178.

Warshaw, P. R., & Davis, F. D. (1985). Disentangling behavioral intention and behavioral expectation. *Journal of Experimental Social Psychology*, 21(3), 213-228.

Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological Bulletin*, 132(2), 249-268.

Werber, B., Baggia, A., & Žnidaršič, A. (2018). Factors affecting the intentions to use RFID subcutaneous microchip implants for healthcare purposes. *Organizacija*, 51(2), 121-131.

Willis Towers Watson (n.d.) *Overview*. Retrieved January 18, 2020, from https://www.willistowerswatson.com/en-US/About-Us/overview

Wojcik, J. (2007). Success begets success with health costs: Survey. *Business Insurance*. Retrieved January 10, 2020 from https://www.businessinsurance.com/article/20070325/story/100023269/success-begets-success-with-health-costs-survey

Zeithaml, V.A. (1988). Consumer perceptions of price, quality, and value: A means-end model and synthesis of evidence. *Journal of Marketing*, 52(3), 2-22.

Zhang, M., Luo, M., Nie, R., & Zhang, Y. (2017). Technical attributes, health attribute, consumer attributes and their roles in adoption intention of healthcare wearable technology. *International Journal of Medical Informatics*, 108, 97-109.

Zhao, Y., Ni, Q., & Zhou, R. (2018, December). What factors influence the mobile health service adoption? A meta-analysis and the moderating role of age. *International Journal of Information Management*, 43, 342-350.

APPENDIX

Instrument

Compatibility (CO)
CO1. Using a health tracker is compatible with all aspects of my health.
CO2. Using a health tracker is completely compatible with my current situation
CO3. I think that using a health tracker fits well with the way I like to stay in shape.
CO4. Using a health tracker fits into my exercise style

Performance Expectancy (PE)
PE1. I find a health tracker useful in my daily life.
PE2. Using health tracker increases my chances of achieving things that are important to me.
PE3. Using health tracker helps me accomplish fitness goals more quickly.
PE4. Using health tracker increases my ability to maintain good health.

Effort Expectancy (EE)
EE1. Learning how to use a health tracker is easy for me.
EE2. My interaction with a health tracker is clear and understandable.
EE3. I find health trackers easy to use.
EE4. It is easy for me to become skillful at using a health tracker.

Social Influence (SI)
SI1. People who are important to me think that I should use a health tracker.
SI2. People who influence my behavior think that I should use a health tracker.
SI3. People whose opinions that I value prefer that I use a health tracker.

Facilitating Conditions (FC)
FC1. I have the resources necessary to use a health tracker.
FC2. I have the knowledge necessary to use a health tracker.
FC3. A health tracker is compatible with other technologies I use.
FC4. I can get help from others when I have difficulties using a health tracker.

Hedonic Motivation (HM)
HM1. Using a health tracker is fun.
HM2. Using a health tracker is enjoyable.
HM3. Using a health tracker is very entertaining.

Price Value (PV)
PV1. Health trackers are reasonably priced.
PV2. Health tracker are a good value for the money.
PV3. At the current price, health trackers provide a good value.

Habit (HT)
HT1. The use of health trackers has become a habit for me.
HT2. I am addicted to using a health tracker.
HT3. I must use a health tracker.
HT4. Using a health tracker has become natural to me.

Behavioral Intention (BI)
BI1. I intend to continue using a health tracker in the future.
BI2. I will always try to use a health tracker in my daily life.

BI3. I plan to continue to use a health tracker frequently.

Irrational Opposition (IO)
IO1. Although both healthy and unhealthy workers are participating, if I participate in a company health-related program, my co-workers may think I am not healthy.
IO2. I am not willing to use health tracker, even if it could increase my chances of survival in an emergency.
IO3. I do not want more information on my physical health or well-being.
IO7. Any initiative that the company produces is probably bad for employees.

Use
Please choose your usage frequency for each of the following:
a) Health tracker
b) Blood Pressure monitor
c) Fitness Software
d) Diet Journal
e) Fitness Journal
f) Exercise Equipment
Note: Frequency ranged from "never" to "many times per day."

Image
"Imagine a one of your male/female colleagues is not participating in the health tracker program. How would you describe him/her using the following characteristics?"
Cool
Smart
Independent
Popular
Self-Conscious
Unattractive
Immature
Dull
Confused
Nerd
Other Information
Age: Age in years.
Gender: Gender of the respondent. Gender was coded using a 0 or 1 dummy variable where 0 represented women.
Experience: Months of experience of the respondent.
Use: Use was measured as a formative composite index of both variety and frequency of health trackers use.