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The Impact of Technology Intensity on Well-being

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Abstract

We model and measure the impact of technology intensity on our well-being in our daily lives. We base the study on two major components: the extent of technology intensity in our daily lives and the feeling of well-being along with its variables. Well-being is measured based on several literature-based components such as physicality, sociality, trust, and reliance on friends and the state. The presence and usage of several devices measure the extent of technology. We pay more attention to the age difference and its role in technology's impact on well-being.

We used a structurally verified questionnaire among 222 responders. The variables in the survey support the research question about the structure of well-being and the extent of technology. We could measure the effect of technology on well-being in general and its components using structural equation modelling. We found that the age of respondents impacts the relationship between technology and well-being.

Keywords: well-being, technology intensity, statistical analysis, magnitude, structural equation modelling

INTRODUCTION

People's well-being and wellness have become important issues in modern life. The seeking for better well-being has already been encouraged since the COVID-19 period. An important factor in well-being is our intensity of use of technology, with its pros and cons. Technologies lead to improved quality of life and a more equitable use of resources. At the same time, they stimulate creativity and innovation,

thus ensuring the progress of the whole society. New digital technologies provide support in maintaining and promoting health. However, despite all these beneficial effects that technologies have, they must be used rationally. Any excessive use of them can cause health problems (e.g., muscle pain, addiction, stress, insomnia, and lack of concentration) that will ultimately affect our well-being (Ortega-Navas, 2017).

There has been much talk in recent years that lifestyle changes, including exercise, stress management, and a healthy diet, can prevent disease and obesity, improving quality of life and well-being. Physical activity is essential because it can contribute to developing specific skills, self-confidence, social inclusion, and a healthy and active lifestyle. In contrast, sedentary behavior, unhealthy eating, and spending too much time on the computer or playing video games have several adverse effects on health, leading to muscle atrophy and decreased exercise capacity. That is why the use of informatics technologies must be made with discernment (Pop, 2017).

Munns (2021) refers to employee well-being as a combination of good physical and mental health. Certain well-being technologies help us stay healthy, encourage us to exercise, or have a healthy diet. Sitting too long at the office (daily sitting hours) is considered to be dangerous (sitting is new to smoking), leading to specific health problems. Some employees are so absorbed in their work that they sit in the chair for many hours. Moreover, wearable tech is useful here because these employees will be urged once an hour to get up from their desks and move. This promotes a healthy lifestyle, and this small effort will improve their overall well-being (Munns, 2021).

The research question is whether the intensity of technology's role in our lives impacts our well-being and to what extent. The study will use statistical methods to reveal the impact of technology on well-being. The measures are essential, and their direct and indirect impact and research methodology will contribute to the literature on well-being.

In the next section, we explore relevant literature, followed by our research hypothesis and description of the study methodology. We give the analysis, the findings, and the discussion of the findings concerning the literature. The paper concludes with conclusions and a summary.

LITERATURE |REVIEW

For a long time, economic indicators, such as GDP, were most often used to measure well-being (Korreveski, 2011). However, it has some shortcomings that need to be addressed. It can not capture the essential aspects of individuals' lives, such as health, social relations, personal security, or education. At the same time, it can put certain negative aspects of well-being in a positive light (Davies, 2014).

Ryff et al. (2003) distinguish between hedonic (or subjective) well-being, which emphasizes happiness and life satisfaction, and eudaimonic (psychological) well-being, which deals with the realization of human potential and functioning in life. However, psychological well-being must be seen as a multidimensional concept based on a series of psychological needs that are or are not met. It refers to how life goes well, a combination of feeling good and functioning efficiently. Therefore, individuals with high well-being will be happy, satisfied, supported, and capable (Akram, 2017).

Subjective well-being, related to experiencing positive emotions, also requires the management of difficult or painful experiences of daily living. It involves more than the absence of symptoms of

suffering or illness; involving internal resources, such as resilience, mindfulness, or self-regulation. In measuring well-being, it is important to consider aspects such as happiness, life satisfaction, sense of meaning and fulfilment, and other positive emotions to feel satisfied and interested, personally and in relationships with others (Huppert, 2017).

Alkire and Kovesdi (2020) refer to life satisfaction as being used to indicate individual well-being, capturing the general life assessment on multiple dimensions: health, education, social relations, and work. Then, the indicator "someone to rely on" refers to the number of close friends or trusted people. Satisfaction with the standard of living is closely related to the income received and personal finances. Happiness resulting from material well-being depends on our past and present state, future goals, or socio-economic conditions. It is possible that sometimes, even when a country's wealth increases, the population's average happiness level will not improve (D'Acci, 2010).

Many studies have shown that the social network is important in appreciating well-being. Thus, those who surround themselves with friends who support them are happier, benefiting from emotional and material support. In OECD countries, solid social networks help build trust in others at the community level. Most say they have someone to rely on in difficult times (Korreveski, 2011). Kahneman and Krueger (2006) also insist that social contact is associated with high positive emotions and that to maximize the well-being of society, it is necessary to shift from the emphasis on consumer opportunities to the emphasis on increasing social contacts.

Next, we will refer to the relationship between technology and well-being, pointing out the role and impact technology produces on individuals and their well-being.

Technology has not been good or bad from the beginning, but how it is used produces differences. Over time, the quality of life and well-being have improved due to technological innovations, with positive effects materializing in increasing incomes and leisure time. Then, as a result of reduced working hours, life expectancy increased. Nowadays, frontier technologies such as the Internet of Things, intelligent robotics, automation, and AI stimulate productivity growth and prosperity, replacing trivial or dangerous tasks with positive effects visible in many areas (Bughin et al., 2019).

Howard-Jones (2011) thinks we should not judge the different types of technologies as good or bad because how they are used, when, and for what purpose matters more. For example, the Internet has many positive benefits, giving us access to much information and helping us communicate efficiently. On the other hand, excessive use of the Internet can lead to depression and anxiety. Excessive use of video games can also be unhealthy and can cause low self-esteem, loneliness, and low satisfaction with daily life.

Brassey et al. (2021) identified several types of digital solutions that companies can implement for the employee welfare strategy. These are:

- Portable materials and digital biomarker apps, which collect data through various methods (e.g., smartphone or smartwatch)
- Prevention and treatment solutions (e.g., Chatbots) that focus on mental health and other aspects of health for a comprehensive picture of employee well-being. Since the beginning of the pandemic, many employees have experienced exhaustion, absenteeism, decreased productivity, and increased stress, but wellness programs can improve their performance.

- Analytical tools that use results from wearables and digital biomarkers.

This study examines the connection between the individual's technology level and well-being. More attention is provided to the impact of age on this relationship.

THEORY BUILDING AND RESEARCH HYPOTHESIS

As a consequence of automation and technology, specific jobs may be threatened, and workers can be laid off. But the good thing is that these technologies can generate new jobs; there is a chance to retrain and acquire new skills for those laid off. Studies show that job loss has a highly negative and lasting impact on well-being. There is also the risk that technology may not quickly offset the negative effect of income loss on welfare. However, the positive effects could emerge from the acceleration of technological innovation (Bughin et al., 2019).

Moral, emotional, and non-cognitive psychological aspects are among the dimensions of well-being most affected by the transforming digital technologies. At the same time, specific privacy issues must be considered (Gluckman & Allen, 2018).

Some examples of expanding technologies that play an essential role include advanced analytics and AI, connectivity and platforms (with mobile internet, digital platforms, and cloud), robotics, the Internet of Things, virtual and augmented reality, digital manufacturing, and clean technology. The development of platforms and other remote work tools, such as online help desks, video conferencing, and shared document access, can allow more people to work independently. By 2025, online talent platforms could allow up to 60 million people to find the right job according to their skills and preferences (Bughin et al., 2019).

If used correctly, cloud technology can benefit users, facilitating a happier and healthier workforce. It offers agility and flexibility and thus improves employee productivity. Technology has a positive impact on job satisfaction and well-being. It also made the mobile workforce concept possible (Horsfall, 2021).

Therefore, we formulate our first research hypothesis.

RQ1: The extent of technology intensity in daily life positively impacts well-being variables.

Previous studies have suggested that objective circumstances such as gender, age, employment status, and income moderately affect well-being. On the other hand, personality traits, social relationships, and social participation affect well-being much more. However, Headey and Wooden (2004) found that wealth is more important regarding well-being than income because it provides economic security. The authors also suggest that previous studies have exaggerated the need for more importance of material factors for well-being, with too much emphasis on social factors and age. We conclude that while the impact on well-being is questionable, and the intensity of technology is higher among young people than older people, there is room to test the impact of age on the relationship between technology and well-being.

Therefore, we want to test our second research question:

RQ2: Age has an impact on the relationship between technology intensity and well-being

METHODOLOGY

The primary mechanism of our methodology is a questionnaire developed and verified for this study. The research variables are taken from the literature, and so are the questions. Then, we tested our research hypothesis using the structural equation modelling approach.

Measures and Data

According to the research model, two demographic variables and ten research variables represent the well-being index. We present the variables in Table 1.

In a survey, we collected data about 222 Israelis. We asked the respondents about their life in general and their perceived and subjective opinions regarding the variables of interest.

We based our choice of variables that appeared as questions in our survey on the literature review.

The Cronbach Index calculated among the questions of the Well Being Index is 0.79. The value of the reliability indices is above 0.7. These results are in the accepted range, and the conclusion is that the questionnaire is reasonably reliable and all the questions adequately reflect the variables we intended to measure.

We define two constructs in our analysis.

The well being constrruct.

This construct consists of the study by Sadeh and Feniser (2022), describing observed variables about various aspects of people's lives. The construct contains nine variables: BMI (Avey et al., 2010), The Degree of satisfaction with the standard of living (Aghili, Venkatesh 2008), the Degree of satisfaction from social contexts (Wright & Huang, 2012), The Degree of sense of ability to deal with problems (Menard, Brunet 2011), The Degree of feeling that there is someone to rely on in times of distress (McLellan, 2017), The Degree of general trust in the country (Wright and Huang, 2012), A sense of the Degree of receiving appreciation from relatives (Wright & Huang, 2012), Number of close friends (Wright & Huang, 2012), and Degree of physical activity (Avey et al., 2010). Sadeh and Feniser (2022) also provide the justification for each variable.

The Technology intensity construct

This construct refers to items related to a person's daily life and daily usage associated with technology. The list includes Number of mobile devices, accounts in social media, number of mobile device upgrades in the last three years, usage of digital calendar, having a prevention collision system (i.e., mobile), regular usage of navigation devices, having streamer or smart TV, using a Tablet.

The loading of all variables is relatively high and significant for each construct.

THE ANALYSIS

We defined a structure equation model and tested its significance. The goodness of fit of the model is very high. Observing the goodness of fit of structural equation models by several indicators is common. The root mean square error of approximation, RMSEA, measures goodness of fit. Values below 0.08 are considered adequate for acceptance; 0.05 indicates a good fit, and 0.01 indicates an excellent fit. The RMSEA of the suggested model is 0.021. The p-value of the Chi-square test is 0.019, indicating a good fit, as it is lower than 0.05. The comparative fit index CFI compares a target model's fit to an independent model's fit. CFI values range from 0 to 1, with larger values indicating better fit. The CFI of the suggested model is 0.949.

The primary estimated parameter of the impact of technology on well-being is 0.286, with a p-value of 0.03. The standardized estimate is 0.327 with a tailed significance of 0.018

(Second and fourth columns in Table 1). Technology intensity has a positive impact on the well-being of people.

In Table 1, we give the total standardized impact of technology intensity on components of well-being..

Variable's Name	Total Effect of Technology, ALL	Total Effect of Technology, OLD	P-Value ALL	P-Value Old.
Well-Being	0.327	0.603	0.018	0.006
Degree of physical activity	0.043	0.097	0.058	0.100
BMI (inverse measure)	0.009	0.023	0.050	0.119
The degree of general trust in the country	0.134	0.224	0.005	0.007
Degree of sense of security	0.179	0.320	0.004	0.007
Number of close friends	0.072	0.184	0.005	0.006
A sense of the degree of receiving appreciation from relatives	0.228	0.399	0.018	0.012
The degree of feeling that there is someone to rely on in times of distress	0.207	0.353	0.015	0.007
The degree of sense of ability to deal with problems	0.179	0.352	0.010	0.007
Degree of satisfaction from social contexts	0.208	0.370	0.014	0.007
The degree of satisfaction with the standard of living	0.212	0.395	0.011	0.003

We can observe that all estimates are significant. The most interesting findings are that technology does affect aspects of well-being related to social lives. The extent of technology intensity has a relatively high impact on the degree of satisfaction with the standard of living (0.212). Satisfaction from social

life (0.208), relying on someone (0.207), and getting appreciation from relatives (0.228). These are aspects that relate to social aspects. We interpret that as technology contributing to communication among people. More devices and social media accounts keep people more connected with others and allow for better well-being.

There is a minor impact on feeling secure (0.179) and trusting the state (0.134). The extent of technology has a minimal effect on physically related aspects such as inverse BMI (smaller values are considered better) and exercising. These are minimal values yet positive.

Our RQ1 is accepted, and technology does have an impact on people's well-being.

The effect of age

To test our second hypothesis RQ2, we considered those above 35 as a sub-research population. This population is about 50% of our study. All effects are larger for those relatively old populations. The technology has a much more enhanced impact on the well-being of older respondents.

When we tested just for persons 36 years old and above in our research sample, we found that this impact is even 0.603 compared to 0.327. This implies that age enhances the role of technology on well-being. Older persons with more technology intensity report better well-being.

We conclude that as age increases, the impact of technology on well-being increases as well. We interpret that older people pay more attention to aspects of well-being. They use the technology to improve their well-being. We, therefore, accept our second hypothesis RQ2.

DISCUSSION

As hypothesized in the literature, technology intensity has an impact on well-being. We established this claim and measured it. How our model was formulated allows us to reveal the effect of technology on well-being in general and on certain variables that construct the well-being construct.

We found that there is room for the different impacts of technology on components of well-being. Social-related variables are more affected by technology; the contribution of this study is to reveal those impacts and measure them.

We see that the role of age is significantly higher impacts of technology on well-being. Results show that mature persons use technology to have better well-being. We assume that young people are born in areas with intensive technology everywhere. Therefore, having the higher impact of technology on well-being among young people does make sense.

CONCLUSIONS AND SUMMARY

The study gives us a way to measure the impact of the extent of technology intensity on well-being. The technology components in this study are taken from the daily usage of devices. The framework of our methodology is based on structural equation modeling that allows us to reveal various aspects of well-being. The findings that technology affects more social aspects than other well-being-related aspects are proven twice: for the research population and the more grown-up persons.

Technology positively impacts well-being, and this impact is even enhanced among grown persons in all aspects of well-being discussed in this study.

The main contribution of this study to the literature lies in the methodology and the revealing of the measurement of technology's impact on well-being. There are more ways to improve this study and its consequences. For example, to increase the samples and look for cultural aspects and cultural differences on the impact of technology on well-being.

Since COVID-19, we have seen widespread technological devices related directly and indirectly to health and better well-being. The tremendous growth of these markets is also one more reason to support this study's findings.

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