Using the 2018 MICS Data, Does Access to ICT Add to Women's Happiness in DR Congo? An Econometric Case Study

## **Abstract**

This study examines the effect of the use of information and communication technologies (ICT) on women's subjective perception of happiness in the Democratic Republic of Congo (DRC) based on the 2018 Multiple Indicator Cluster Surveys (MICS-Palu). The choice of this period is based solely on the availability and reliability of the variables used. The ICT usage index is the variable of interest in the estimated models. It is constructed using the ACM method and is based on five variables measuring the frequency of telephone, computer, and internet use, as well as the frequency of television viewing and radio listening. By performing an ordinal logistic regression analysis on a sample of 21,756 observations, the results confirm the hypothesis that there are plausible reasons to describe ICT as a desirable event likely to improve women's subjective well-being. The results also show that this effect is much greater for women living in urban areas than for those living in rural areas. Finally, the results show that this effect is less significant for women living in unions. It is therefore essential that policymakers implement strategies to expand access to ICT, particularly by strengthening technological infrastructure in rural areas, where women are often disadvantaged in terms of access to information and digital resources. Investing in targeted awareness-raising and training programs on the use of ICTs could also promote better integration of these technologies into women's daily lives, enabling them to take full advantage of the opportunities they offer. In addition, it would be useful to study and address the complex dynamics associated with the use of ICTs in the marital context. Educational programs could include specific modules on digital interactions within couples to raise awareness among partners about the benefits and challenges of using technology. This could help create a more favorable environment for the use of ICTs, thereby reducing potential tensions.

Keywords: Happiness, Technology, ITC, Internet, Woman, Democratic

JEL CODES: I32, C50, O3

## **Introduction**

Globalization has made the economics of happiness a very fruitful field of investigation, attracting numerous researchers from several fields of social sciences, particularly sociology, psychology, philosophy and economics. Starting from the Leiden school in the Netherlands in the 1970s , the field of happiness economics took on a remarkable scale from 1990, notably with the famous “Easterlin paradox ” which calls into question the link between income and long-term happiness. Thus, the field of happiness economics opens with a major observation that we do not observe an upward trend in happiness, even during periods of sustained growth. This trend seems to demonstrate the futility of growth. Consequently, for a large number of researchers, if growth is exclusive growth, that is to say if it cannot allow a large number of people to achieve the hoped-for happiness which is moreover a fundamental transversal objective of 17 Sustainable Development Goals (SDGs), it is necessary to rethink a new path to happiness by putting non-economic factors into perspective. This is the aim of this study, which axamines the effect of ICT on women subjective well-being in Democratic Republic of Congo. ICTs (Information and Communication Technologies) refer here to all technologies used to collect, process, store and transmit information. This includes hardware such as computers and smartphones, as well as software and communication platforms.

Indeed, recent literature on the determinants of well-being from a macroeconomic point of view is abundant and fragmented ( Malah et al., 2022; Mignamissi , and Kuete ; 2021; Malah , 2021; Kouladoum et al., 2023). Among the macroeconomic work carried out to date on the factors influencing well-being, we find those which have determined its institutional factors ( Sulemana et al., 2016, Fischer, 2010, Kim et al., 2012); socio-economic factors ( Pinquart and Sorensen, 2000 ; Zhou et al., 2015 ; Tan and Kraus, 2020 ) and those that have determined how it is influenced by the diffusion of ICT ( Lohmann , 2015 ; Scherer et al., 2011 ; Kavetsos and Koutroumpis , 2011; Salanova and Cifre , 2004 ; Kouladoum et al., 2023; Diener et al., 1999 and Graham, 2009 ). Despite this emerging literature on the determinants of happiness, most of this work has analyzed objective well-being. However, this research carried out mainly on the basis of objective measures of well-being does not effectively account for the happiness situation, as declared by individuals. It's about subjective happiness. It is from this perspective that economists, starting from sociodemographic surveys of individuals, where happiness is measured according to a “declarative” system, have attempted to analyze the factors that can make people happier. Most of this work establishes a distinction between “objective” factors (income, marital status, socio-professional situation, place of residence, level of education) and “subjective” factors (satisfaction with one's level of life, money worries, experience of poverty, stress, sexuality, sport) ( Schkade and Kahneman , 1998; Borooah , 2006; Stutzer and Frey, 2006; Araki, 2022; Rival, 2020; Islam and Goldwasser , 2020). However, even if there is an emerging literature on the determinants of the perception of subjective happiness, very little is known regarding the role of digitalization on consumer well-being.

Indeed, according to ITU statistics (2018), the use of ICT is increasing globally. At the end of 2018, it was estimated that 51.2% of the world's population, or 3.9 billion people, used the internet ( Myovella et al., 2020 ). In sub-Saharan Africa, the number of people using the internet increased from 2.1% in 2005 to 24.4% in 2018, while mobile subscriptions stood at 77 per 100 inhabitants (ITU, 2018). This trend does not escape the Democratic Republic of Congo. Indeed, according to World Bank statistics (2023), the Democratic Republic of Congo (DRC) recorded an internet and social media penetration rate of 17.6% of the overall population, which constitutes a leap by 23% between 2021 and 2022 (World Bank Group [[1]](#footnote-1)).

ICTs are now an integral part of daily life ( Kavetsos , and Koutroumpis , 2011). Although the literature has largely neglected the effects of ICT on individual well-being with a greater emphasis on economic factors, recent work is beginning to show that landline and mobile phones, music players and personal computers, including Internet connection, are associated with significantly higher levels of well-being and individual life satisfaction of their users ( Kavetsos , and Koutroumpis , 2011). Indeed, it is possible that these tools influence the level of happiness of their users in different ways depending on whether you are a man or a woman. For example, following the achievement of the SDGs, ICT can play an important role in achieving gender equality and empowering women **.** Through ICTs, women and girls can access information important for their productive, reproductive and community roles and obtain additional resources for improving their life satisfaction. Access to ICT allows women to make their voice better heard in their communities, to promote their participation in life. ICTs also offer women a certain flexibility in time and space, which can be particularly interesting for women facing social isolation .

However, it should be noted that ICT does not essentially bring good as noted in the literature, but is also a source of problems and cybercrime in terms of identity theft, scams, deviances likely to negatively influence consumer well-being. For example, using cross-sectional data from the World Values Survey, Lohmann (2015) finds an indirect negative effect of access to the internet on subjective well-being, since people who regularly use the internet as a source information get less satisfaction from their income. This negative effect could be understood differently depending on gender. Indeed, even if we observe the emergence of digital professions which allow women to flourish, most women will tend to feel this negative effect of ICTs more, through sexual assault, sexual harassment, calls unannounced, misogynistic speeches, sexist image content and unflattering clothing styles, which in one way or another alter the psychological well-being of some women, if not the community. Hence the following research question: does the use of ICTs contribute to making women happier in the Democratic Republic of Congo?

The objective of this article is to analyze the effects of the use of ICTs on the perception of women's well-being in the DRC using data from the Multiple Indicator Cluster Survey (MICS-Palu 2018). On a theoretical level, this article is based on welfare economics, which is an approach to normative economics based on the evaluation of situations of social well-being defined as optimal in the sense of Pareto . It deals with questions related to the relationship between economics and moral well-being, in particular the ways in which economic goods could provide an increase in collective well-being, especially when dysfunctions are noted in the economic system. Thus, this article supports the hypothesis according to which the use of ICTs, which are economic goods, positively influences the subjective well-being of women in the DRC.

The rest of the paper is structured as follows: Section 2 presents the theoretical literature and empirical findings concerning the effect of information and communication technologies on happiness. Section 3 presents the data and methodological strategy. Section 4 presents and discusses the results, while Section 5 concludes with policy recommendations and guidelines for future research.

## **Theoretical approach and literature review**

**Theoretical approach**

Well-being has long been considered a phenomenon that could be measured with economic and monetary indicators alone, or even with indicators of health or absence of morbidity ( Greyling , 2018). The first measures of well-being on a national and international scale focused mainly on GDP, considering that wealth and the possession of material goods were indicative of a better level of well-being. However, from 1974, the work of Richard Easterlin , an American demographic economist, revolutionized this way of thinking by pointing out the fact that several dimensions of well-being escape the measurement of GDP, whether non-market dimensions ( domestic work, childcare, leisure time, time spent with loved ones, etc.) or even characteristics specific to societies (their democratic character, freedom of movement and thought, access to effective and independent justice) ( Greyling , 2018). Critics of the Indian economist, winner of the noble prize, Amatya Sen also adds that what really matters are the capabilities that people have, that is to say the set of possibilities available to them and their freedom to choose, from this whole, the type of life to which they value. According to him, a person's quality of life depends on their autonomy and the possibilities offered to them to improve their own living conditions. Following Sen, several authors postulate that the measurement of well-being requires both objective and subjective data, that is to say that subjective well-being is just as important to take into account as its more objectifiable aspects (health and resources). According to Diener et al. (1999), the subjective well-being of individuals is linked to what Wilson (1967) describes as the theory of “need satisfaction”. The majority of empirical research adopts this theoretical approach by showing that desirable events increase subjective well-being, while undesirable events decrease it ( Stallings et al. 1997). It is this theoretical approach that is adopted in this article. From the above, we can deduce that if access to ICT is a desirable event, it should increase the subjective well-being of women, but if it is undesirable, we expect a decrease in the subjective well-being of women in the DRC .

Theoretically, there are some plausible reasons to describe the use of ICT as a desirable event, as there is growing evidence of the benefits that ICT has for women's empowerment, by facilitating their access to health, nutrition, education and other opportunities for human development, such as participation in political and family life such as communicating with friends and family (Facebook) or for leisure ( watching films) ( Franzen 2003). The availability of information and communication technologies (ICTs) plays a decisive role in empowering women, particularly by offering them opportunities to participate in the labor market, access training and improve their skills. ICTs enable women to overcome barriers linked to geographical isolation, traditional social roles, and limited access to educational and professional resources. Hafkin and Huyer (2007) point out that ICTs enable women to engage in entrepreneurial activities and distance learning, helping to reduce gender inequalities in the economic sphere. In addition, Hilbert (2011) indicates that access to ICT offers women the opportunity to improve their participation in the labor market by giving them access to information, professional networks, and online training, thus contributing to their social and economic inclusion.

**Access to ICT and subjective well-being of women**

The vast majority of studies that have examined the direct relationship between internet access and subjective well-being have found a positive association ( Greyling , 2018). However, most of this work has been carried out in developed countries and the question of whether this relationship holds in developing countries has not yet been resolved. The study by Kavetsos and Koutroumpis (2011), which uses cross-sectional data pooled for European countries, concludes that having a landline or mobile phone, a music player, a personal computer and Home internet access is associated with higher levels of subjective well-being. The study by Pénard et al. (2013) provides similar conclusions using Luxembourg data from the European Value Survey. The study reveals that non-users are less satisfied with their lives than Internet users. Furthermore, their results show that the positive influence of Internet use is stronger among younger users or those who are dissatisfied with their income. Cotten et al. (2012) further reveal that internet access not only improves subjective well-being but also reduces depression among American retirees aged over 50. A recent study by Ganju , Pavlou , and Banker (2016) reaffirmed the aforementioned findings. They studied the role of ICT on the subjective well-being of countries. To measure subjective well-being at the national level, they used data from the Gallup World Poll and for ICT data, they used the World Bank database. The study argues that ICT can improve people's subjective well-being by developing their social capital, achieving social equality, enabling access to information and health services, providing education to communities disadvantaged and facilitating trade. Their results reveal that the level of ICT use in a country is statistically significant and positively related to subjective well-being. Furthermore, they find that less developed countries increase their welfare level by mainly using mobile phones, while more developed countries increase their welfare level with any ICT system. Building on the theme of Internet use and subjective well-being, Pierewan and Tampubolon (2014) analyze the relationship before, during and after the financial crisis in Europe. They use four waves of the European survey, from 2004 to 2010, for their analysis and a multi-level model to understand how contextual factors explain individual well-being. They find that before the financial crisis, Internet use was not associated with subjective well-being, but in 2007 and after, a positive relationship was found. In the only study of sub-Saharan African countries, Graham and Nikolova (2013) report, using data from the Gallup World Poll , that subjective well-being is higher in countries with access to Internet and mobile banking are more important than in countries where access is limited; however, in these countries, increased levels of anger and frustration are also reported (Graham and Nikolova 2013). The study The Impact of ICT Development on Female Employment and Household Well-Being in Vietnam (Nguyen-Phung et al., 2024) investigates, using 2012–2018 national survey data and a fixed-effects model, how ICT expansion shapes married women’s employment opportunities and household welfare. Findings indicate that greater ICT development boosts vulnerable women’s access to formal contracts, enhances per-capita calorie intake, and reduces their working hours. The authors note, however, that the analysis is constrained by the lack of qualitative data on actual ICT usage and the challenge of fully disentangling ICT effects from concurrent socio-economic changes. Using a dataset collected in Chile, Donoso et al. (2021) show that students attending schools with strong digital development have higher levels of subjective well-being. This trend of a positive and significant relationship between the use of information and communication technologies and subjective well-being is also beginning to be observable in the context of developing countries. For example, using nationally representative data from the Chinese Family Panel Studies, Lu and Kandilov (2021) find that mobile internet use has a significant positive impact on the well-being of older adults. in China. Using a dataset representative of the population of Gauteng, the economic hub of South Africa, Greyling (2018) shows that internet access is positively related to subjective well-being and that this relationship holds for all racial groups and all age groups, from 18 to over 65. Furthermore, it appears that the stark inequalities between racial groups present in South Africa are fading among younger generations. More recently, Kouladoum et al. (2023) assess the effect that technology transfers have on ­subjective well-being in Africa; more precisely in 29 African countries. The results indicate that technology transfer improves the well-being of Africans. Furthermore, the authors underline the importance of ICT diffusion and education as significant factors likely to stimulate technology transfers to improve the well-being of Africans.

The importance of ICTs (information and communication technologies) to women's happiness can be attributed to their role in providing access to resources, education and economic opportunities. ICTs help women bridge the gap to services, contributing to their socio-economic and psychological well-being (Odame et al., 2005). In urban areas, women may benefit more from these technologies due to better infrastructure and greater access to ICT-related resources, while women in rural areas may face limitations such as poor connectivity or a lack of digital literacy. Nevertheless, even in rural areas, ICT can make a significant contribution to empowerment by offering new opportunities for education and community involvement (Chapman and Slaymaker, 2002). Age differences also play a role, as younger women tend to be more adaptable and tech-savvy, using ICT to access social networks, employment and educational opportunities. Older women, on the other hand, may face difficulties related to technology adoption, but can nevertheless benefit from ICT in areas such as healthcare and social communication.

Based on the above, this article hypothesizes that access to ICT can promote the well-being of women in the DRC, all other things being equal.

## **Methods**

### **Sample**

The data used to answer the research question of this study come from the 2018 Multiple Indicator Cluster Surveys (MICS-Palu) of the Democratic Republic of Congo, conducted under the auspices of UNICEF. These surveys are meticulously designed to provide essential indicators for assessing the well-being of children and women, and are a valuable tool for policymakers and researchers (WHO, 2016). MICS surveys are renowned for their robust methodological frameworks and extensive data collection processes, ensuring that the data collected is both comprehensive and reliable (Martin & Zulaika, 2016). This meticulous planning enables the generation of data that not only reflects current conditions, but is also crucial to understanding trends over time. The MICS-Palu 2018 survey, in particular, stands out for its considerable efforts to capture a wide range of indicators related to health, education and general well-being. By covering a wide range of topics, including infant mortality, nutrition, education and access to drinking water, this dataset offers an invaluable resource for examining various aspects of life in the Democratic Republic of Congo, particularly with regard to vulnerable populations such as women and children.

In addition to their role in assessing current conditions, MICS surveys are essential for tracking progress towards national and international development goals. The data collected is essential for tracking progress towards the Sustainable Development Goals (SDGs), particularly those aimed at improving health, education and gender equality (Khan & Hancioglu, 2019). The 2018 MICS-Palu survey, part of the sixth generation of these surveys, contributes to a long tradition of data-driven evaluation and policy-making. It provides a wealth of information that helps stakeholders at different levels, from government agencies to international organizations, to make informed decisions aimed at improving the quality of life of children and women in the Democratic Republic of Congo. It has a total of 21,756 women surveyed whose respondents' ages range from 15 to 49.The extensive and detailed nature of the MICS-Palu dataset also makes it an ideal source for research, enabling in-depth analyses that can reveal critical insights into the socio-economic and health-related challenges facing the population.[[2]](#footnote-2)

### **Selection and justification of variables**

#### **Dependent variable**

Irwin et al., (1979) emphasize the idea that subjective well-being, such as happiness, can be measured effectively through self-report. This implies that individuals are the best judges of their own emotional states, and that simply asking them directly if they are happy can provide accurate and meaningful information. The authors state that “If you want to know how happy I am, just ask me”. However, this declaration-based measure of well-being is criticized in the literature. And one of the most virulent and powerful criticisms of the declaration of well-being and perhaps happiness comes from the economist Amartya Sen in his approach to capability. According to Sen, a person's quality of life depends on his or her autonomy and the opportunities available to him or her. For a poor person, who has always lived in deprivation and precariousness, with fewer possibilities and less freedom of action to change his or her situation, may come to get used to his or her situation, resigning himself or herself to it, making the best of it and declaring himself or herself relatively happy. But should we take this statement seriously? This criticism brings home the importance of considering happiness scales in relation to the individual's frame of reference. Indeed, the Democratic Republic of Congo Multiple Indicator Survey (MICS- Palu 2018) is conducted by inviting respondents to answer questions about their perception of happiness, using answers ordered as follows: (1= very unhappy, 2= fairly unhappy, 3= neither happy nor unhappy, 4= fairly happy and 5= very happy). Self-reported happiness is our dependent variable. Given the small sample sizes of Congolese women giving scores 4 and 5, we reduced the range of scores to three categories: score 1 (unhappy) is made up of the previous scores 1 and 2, score 2 (quite happy) is made up of the previous score 3, and score 3 (happy) is made up of the previous scores 4 and 5.

#### **Independent variables**

The index of information and communication technology (ICT) use is the variable of interest in the estimated models. It is based on five variables measuring the frequency of telephone, computer and Internet use, as well as the frequency of television viewing and radio listening. These variables are coded on a scale of 1 to 4, where 1 means “No, not at all” and 4 means “Almost every day”. To construct the index, we used the Multiple Correspondence Analysis (MCA) method. After checking and dealing with outliers in the data, we ran the MCA to extract the factor scores of the individuals. To ensure that high scores on the index reflected more frequent and positive use of ICT, we corrected the results by inverting the sign of the extracted scores. Thus, a high score on the final index indicates frequent and diversified use of ICT, while a low score suggests limited use. The practice of using multiple correspondence analysis (MCA) to construct an index, correcting for outliers, extracting factor scores and adjusting them to ensure that high scores reflect frequent ICT use is well supported by academic multivariate analysis methods. MCA is commonly used when analyzing qualitative survey data, transforming categorical variables into quantitative factor scores (Atkinson, 2024). This transformation creates a synthetic variable that can be adjusted, for example by reversing the sign of the scores, to ensure an interpretation in line with the research objectives, in this case by reflecting a more frequent and diverse use of ICT. This method has been applied in studies in a variety of fields, including sociological and economic research. By extracting factor scores, we aim to reduce the complexity of categorical data, enabling relationships to be interpreted more clearly. Inverting scores or adjusting them to ensure consistency with the research hypothesis is also a recognized step, as indicated by sources dealing with MCA applications in data analysis.

#### **Control variables**

In this study, the control variables considered were: education, age, marital status, health insurance, time since last sexual intercourse, functional difficulties, place of residence, number of deceased children, HIV testing experience, gender discrimination and ehtnic discrimination. These variables have been recoded to meet the needs of the analysis. For education, we have maintained the original coding, which is as follows: (1 = pre-primary/no education, 2 = primary, 3 = secondary and 4 = tertiary), as for age: (1 = 15-19, 2 = 20-24, 3 = 25-29, 4 = 30-34, 5 = 35-39, 6 = 40-44 and 7= 45-49). For marital status, initially coded as follows: (1= currently married, 2= currently in a relationship, and 3= not in a relationship), we combined the first two modalities to obtain ( 1 = In a relationship and 2 = Not in a relationship) . Health insurance is coded as follows: (1 = has insurance and 2 = does not have insurance). The “Last sexual relationship” variable is coded as follows: (1 = number of days, 2 = number of weeks, 3 = number of months and 4 = number of years). The “Functional difficulties” variable is coded as follows: (1 = no difficulties, 2 = some difficulties and 3 = many difficulties). The “Place of residence” variable is coded as follows: ( 1 = Urban and 2 = Rural). The variable “Number of dead children” is coded as follows: ( 1= No dead children, 2= 1-5 dead children and 3 = 6-10 dead children), the variable “HIV test” is coded as follows: (1 = Yes and 2 = No). the variable gender discrimination is coded as (1 = Has already been a victim and 2 = Has never been a victim) and finally the variable ethnic discrimination is coded as (1 = Has already been a victim and 2 = Has never been a victim). These variables were chosen on the basis of parsimony, theoretical relevance and the practical importance of happiness (Davidovic, M. 2021; Chai and Kalyal 2019; Chyi, H., and Mao, S. 2012).

### **Sample characteristics**

Table 1 presents the characteristics of the sample, comprising 14,022 women in union and 7,734 women not in union. With regard to self-reported happiness, 23.56% of women in union declared a low level of happiness, while 46.94% reported a high level. For women not in union, these percentages were 21.11% and 50.74% respectively. In terms of cell phone use, women in union are less likely to use it on an almost daily basis compared to their counterparts not in union (15.13% vs. 21.33%, p < 0.001), and for use at least once a week (5.31% vs. 5.57%, p < 0.001). Similarly, women in union are less likely to use the Internet than those not in union, with respective proportions of 0.42% versus 1.73% for daily use, and 0.28% versus 1.29% for weekly use (p < 0.001 in both cases). With regard to computer use, the results also show that women in union use it less often, with 0.31% for quasi-daily use versus 0.67% for women not in union, and 0.34% versus 1.55% for weekly use (p < 0.001).

In addition, women in union were less likely to watch television frequently than women not in union (7.14% vs. 14.41% for daily frequency, and 2.98% vs. 4.55% for weekly frequency, p < 0.001 in both cases). Conversely, women in union listen more to the radio than those not in union, with a proportion of 7.33% versus 6.80% for almost daily frequency (p < 0.001). The table also shows other significant differences between these two groups. For example, only 2.1% of women in union have a higher level of education, compared with 5.02% of women not in union. Conversely, 38.33% of women in union have primary education, compared with 28.08% of women not in union. Furthermore, 21.41% of women in union were aged between 30 and 34, compared with 7.16% of women not in union (p < 0.001).We found that only 2.15% of women in union with a partner had health insurance, while 97.85% had no medical coverage at all. Among women not in union, the rate of access to health insurance is slightly higher, reaching 2.92%, but remains extremely low in the Democratic Republic of Congo (p < 0.001). In addition, 17.46% of women in union reported not having had sexual intercourse for several weeks, compared with 10.55% of women not in union (p < 0.001). Concerning the loss of children, 12.03% of women in union reported having lost between one and five children, compared with 7.56% of women not in union (p < 0.1). Table 1 also reveals that 9.05% of women in union experienced ethnic discrimination, compared with 7.84% of women not in union (p < 0.001).

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| Table 1 : Characteristics of the Analitic Sample (%). Democratic Republic of Congo's Multiple Indicator Cluster Survey (MICS- Palu 2018) |
| Respondents'characteristics | Marital\_status | In union versus Not in uniona |
| In union | Not in union |
| N = 14 022 | N = 7 734  |
| **Hapiness** |  |  | \*\*\* |
| Unhappy | 23,56 | 21,11 |  |
| Fairly happy | 29,5 | 28,14 |  |
| Happy | 46,94 | 50,74 |  |
| **Cell Phone** |  |  | \*\*\* |
| Not at all | 73,35 | 67,17 |  |
| Less than once a week | 6,2 | 5,92 |  |
| At least once a week | 5,31 | 5,57 |  |
| Almost every day | 15,13 | 21,33 |  |
| **Use of Internet** |  |  | \*\*\* |
| Not at all | 0,94 | 1,98 |  |
| Less than once a week | 0,31 | 1,33 |  |
| At least once a week | 0,28 | 1,29 |  |
| Almost every day | 0,42 | 1,73 |  |
| **Use of Computer** |  |  | \*\*\* |
| Not at all | 2,37 | 4,60 |  |
| Less than once a week | 0,44 | 1,80 |  |
| At least once a week | 0,34 | 1,55 |  |
| Almost every day | 0,31 | 0,67 |  |
| **Television** |  |  | \*\*\* |
| Not at all | 86,14 | 75,11 |  |
| Less than once a week | 3,77 | 5,92 |  |
| At least once a week | 2,98 | 4,55 |  |
| Almost every day | 7,14 | 14,41 |  |
| **Radio** |  |  | \*\*\* |
| Not at all | 77,49 | 74,76 |  |
| Less than once a week | 9,10 | 11,41 |  |
| At least once a week | 6,10 | 7,02 |  |
| Almost every day | 7,33 | 6,80 |  |
| **Place of residence** |  |  | \*\*\* |
| Urban | 28,24 | 42,91 |  |
| Rural | 71,76 | 57,09 |  |
| **Age\_group** |  |  | \*\*\* |
| 15-19 | 8,12 | 50,92 |  |
| 20-24 | 16,47 | 19,1 |  |
| 25-29 | 19,87 | 9,46 |  |
| 30-34 | 21,41 | 7,16 |  |
| 35-39 | 15,74 | 5,13 |  |
| 40-44 | 11,2 | 4,55 |  |
| 44-49 | 7,19 | 3,67 |  |
| **Education** |  |  | \*\*\* |
| Pre-primary/none | 22,54 | 13,5 |  |
| Primary | 38,33 | 28,08 |  |
| Secondary | 37,03 | 53,4 |  |
| Superior | 2,1 | 5,02 |  |
| **Health Insurance** |  |  | \*\*\* |
| Has insurance | 2,15 | 2,92 |  |
| Has no insurance | 97,85 | 97,08 |  |
| **Last Sexual Intercourse** |  |  | \*\*\* |
| Number of days | 60,63 | 12,57 |  |
| Number of weeks | 17,46 | 10,55 |  |
| Number of months | 18,55 | 25,38 |  |
| Number of years | 3,35 | 17,47 |  |
| **Functional Difficulty** |  |  | \* |
| No difficulty | 84,42 | 58,31 |  |
| Some difficulties | 12,03 | 7,56 |  |
| Many difficulties | 1,79 | 1,41 |  |
| **Number dead children** |  |  | \*\*\* |
| No dead child | 79,43 | 94,28 |  |
| 1-5 children dead | 20,46 | 5,72 |  |
| 6-10 children dead | 0,11 | 0 |  |
| **HIV testing** |  |  | \*\*\* |
| Yes | 11,82 | 13,01 |  |
| No  | 56 | 62,06 |   |
| **Gender\_discrimination** |  |  |  |
| Already been discriminated | 7,88 | 7,62 |  |
| Never been discriminated | 92,14 | 92, 35 |  |
| **Ethnic\_discrimantion** |  |  | \*\*\* |
| Already been discriminated | 9,05 | 7,84 |  |
| Never been discriminated | 90,97 | 92,13 |  |

Source: the Democratic Republic of Congo's Multiple Indicator Cluster Survey (MICS-Palu 2018). aChi² test results comparing differences between assaulted and non-assaulted women in the Democratic Republic of Congo. \*\*\*p < .001.

### **Data Analysis**

We used ordinal logistic regression analysis, as the dependent variable was a three-category ordered variable. Results were presented as odds ratios (OR). The purpose of these ratios is to identify the potential change in the dependent variable due to the focal independent variables. The odds ratio is the ratio between two odds. In our study, ORs refer to the probability that Congolese women report feeling happy, divided by the probability that respondents report feeling fairly happy or unhappy. Specifically, ORs above 1 indicate that Congolese women were more likely to report feeling happy, while ORs below 1 imply lower odds of reporting feeling happy. Finally, we examined the marginal effects of the focal independent variables and the interaction terms on the three categories of happiness perceived by women in the Democratic Republic of Congo. STATA 14 software enabled us to carry out in-depth statistical analyses and process the data efficiently, making it easier to understand the factors influencing women's well-being in this specific context.

### **Model specification**

We estimate the following model:

Logit (P (Y≤ j)) = $β\_{0}$ + $β\_{1}X\_{1}$ + $β\_{2}X\_{2}$ + $β\_{3}X\_{3}$ + … + $β\_{n}X\_{n}$ $+$ $ε$

Logit (P (Y≤ j)) = ln [(P (Y≤ j)) / (1- P (Y≤ j))]represents the logit of the probability of occurrence versus non-occurrence of the event of interest which, in our research, is self-reported happiness among Congolese women; j is the value of the dependent variable (j = Unhappy, Fairly happy or Happy). Initially, in Model 1, we examined the bivariate associations between self-reported happiness and the focal independent variable of ICT ($X\_{1}$), as well as the observed covariates: ($X\_{n}$, n = 2, 3, . . . , 12). We then incorporated the aforementioned covariates to explore the net association between ICT use and self-reported happiness in Model 2. Furthermore, to test whether the potential association between ICT use and happiness among Congolese women differs according to certain socio-demographic characteristics, we estimated ordinal logistic regression analyses with interaction terms (ICT use ˣ Marital status) in models 3 and 4, (ICT use ˣ Residence status) in models 5 and 6, (ICT use ˣ Age group) in models 7 and 8. We processed the crude associations in models 3, 5 and 7, then included all the above controls in models 4, 6 and 8 to estimate the net association.. $β\_{0}$ is the intercept and coefficients ($β$) are estimated coefficients (logits).

# **Empirical Results**

Table 2 presents the ORs of ordinal logistic regression models to determine whether women who have used ICTs are more likely to report higher levels of perceived happiness, and whether this association differs according to marital status. In Model 1, we found that ICT use was positively related to sujbective perception of happiness among Congolese women (OR = 1.239, p < 0.001) at the bivariate level. Similarly, marital status was associated with the dependent variable, with women not in union being less happy than those in union (OR = 1.159, p < 0.001). Examining the relationship at the multivariate level, as shown in Model 2, the positive association between ICT use and self-reported happiness among Congolese women persisted (OR = 1.123, p < 0.001), as did the negative association between marital status (not in union) and self-reported happiness (OR = 0.847, p < 0.001). Furthermore, as indicated by the multivariate results of model 3, we found that the positive relationship between ICT use and happiness persisted when we included the interaction term (OR = 1.271, p < 0.001). The interaction term (ICT \* In union) was itself statistically significant (OR = 0.945, p < 0.001), indicating that people Congolese women in union felt less happy when using ICT than others not in union. As Model 4 shows, when the theoretically relevant covariates were included, the association between ICT use and women's happiness still persisted (OR = 1.271, p < 0.001). The same was true for the interaction term and women's happiness (OR = 0.962, p < 0.01). In addition, marital status (Not in union) is negatively related to happiness perceived by Congolese women in model 3 (OR = 1.214, p < 0.001) and model 4 (OR = 0.902, p < 0.1).

**Table 2**. Odds ratios of ordinal logistic regression models predicting self-reported happiness among Congolese women (aged 15-49), Democratic Republic of Congo's Multiple Indicator Cluster Survey (MICS- Palu 2017-2018).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Predictors of Interest | Model 1 | Model 2a | Model 3 | Model 4 |
| Bivariate | Multivariate | Multivariate | Multivariate |
| **ICT Index** |  1.239\*\*\* |  1.123\*\*\* |  1.271\*\*\* | 1.147\*\*\* |
| **Marital Status** |  |  |  |  |
| In union | 1. 000 | 1. 000 | 1. 000 | 1. 000 |
| Not in a union | 1.159\*\*\* | 0.847\*\*\* | 1.214\*\*\* | 0.902\* |
|  **ICT Index \* In union** |  |  | 0.945\*\*\* | 0.962\*\* |
| **Residence status** |  |  |  |  |
| Urban | 1. 000 | 1. 000 |  | 1. 000 |
| Rural | 0.636\*\*\* | 1.022 |  | 1.021 |
| **Age\_group** |  |  |  |  |
| 15-19 | 1. 000 | 1. 000 |  | 1. 000 |
| 20-24 | 0.715\*\*\* | 0.733\*\*\* |  | 0.730\*\*\* |
| 25-29 | 0.640\*\*\* | 0.654\*\*\* |  | 0.651\*\*\* |
| 30-34 | 0.609\*\*\* | 0.710\*\*\* |  | 0.707\*\*\* |
| 35-39 | 0.530\*\*\* | 0.608\*\*\* |  | 0.606\*\*\* |
| 40-44 | 0.526\*\*\* | 0.627\*\*\* |  | 0.625\*\*\* |
| 45-49 | 0.528\*\*\* | 0.700\*\*\* |  | 0.698\*\*\* |
| **Educational attainment** |  |  |  |  |
| Pre-primary/none | 1. 000 | 1. 000 |  | 1. 000 |
| Primary | 1.429\*\*\* | 1.304\*\*\* |  | 1.309\*\*\* |
| Secondary | 2.380\*\*\* | 1.815\*\*\* |  | 1.823\*\*\* |
| Superior | 5.279\*\*\* | 3.569\*\*\* |  | 3.504\*\*\* |
| **Whether have insurance** |  |  |  |  |
| Yes | 1. 000 | 1. 000 |  | 1. 000 |
| No | 0.434\*\*\* | 0.639\*\*\* |  | 0.637\*\*\* |
| **Last Sexual Intercourse** |  |  |  |  |
| Number of days | 1. 000 | 1. 000 |  | 1. 000 |
| Number of weeks |  1.017 | 0.943 |  | 0.944 |
| Number of months | 0.943\* | 0.886\*\*\* |  | 0.890\*\* |
| Number of years | 0.636\*\*\* | 0.672\*\*\* |  | 0.676\*\*\* |
| **Self-reported physicalhealth status** |  |  |  |  |
| Healthy | 1. 000 | 1. 000 |  | 1. 000 |
| Some difficulties | 0.587\*\*\* | 0.672\*\*\* |  | 0.673\*\*\* |
| Many difficulties | 0.264\*\*\* | 0.333\*\*\* |  | 0.334\*\*\* |
| **Number dead children** |  |  |  |  |
| No dead child | 1. 000 | 1. 000 |  | 1. 000 |
| 1-5 children dead | 0.595\*\*\* | 0.792\*\*\* |  | 0.791\*\*\* |
| 6-10 children dead | 0.517 | 0.886 |  | 0.881 |
| **Whether tested for HIV** |  |  |  |  |
| Yes | 1. 000 | 1. 000 |  | 1. 000 |
| No  | 0.745\*\*\* | 0.956 |  | 0.954 |
| **Gender\_discrimination** |  |  |  |  |
| Already been discriminated | 1. 000 | 1. 000 |  | 1. 000 |
| Never been discriminated | 2.050\*\*\* | 1.842\*\*\* |  | 1.836\*\*\* |
| **Ethnic\_discrimantion** |  |  |  |  |
| Already been discriminated | 1. 000 | 1. 000 |  | 1. 000 |
| Never been discriminated | 1.880\*\*\* | 1.338\*\*\* |  | 1.335\*\*\* |
| **Total** | **21 756** | **21 756** | **21 756** | **12 700** |
| **Log likelihood** |  | -12904.536 | -22513.95 | -12902.047 |

aThe Variance Inflation Factor ranges from 1.05 to 2.42.

p < .1. \*p < .05. \*\*p < .01. \*\*\*p < .001.

Table 3 presents the Odds Ratios (OR) of ordinal logistic regression models, aimed at examining whether ICT (Information and Communication Technology) use is associated with a higher level of perceived happiness among women, while accounting for differences linked to area of residence and age group. In Model 5, we observed that the inclusion of the interaction term (ICT \* Rural) shows that ICT use is positively related to higher perceived happiness among Congolese women (OR = 1.252, p < 0.001). Furthermore, place of residence is also significantly associated with the dependent variable: women living in rural areas are less likely to be happy compared to those living in urban areas (OR = 0.674, p < 0.001). In Model 6, we found that the positive association between ICT use and self-reported happiness persisted (OR = 1.175, p < 0.001), and that the negative association between rural location and happiness also held (OR = 0.825, p < 0.01). The interaction term (ICT \* Rural) is statistically significant (OR = 0.905, p < 0.001), indicating that women living in rural areas experience a less positive effect of ICT on their happiness than those living in urban areas. In Model 7, the inclusion of the interaction term (ICT \* 25 - 34 years) shows that ICT use is still positively associated with perceived happiness (OR = 1.229, p < 0.001). Age was also significant, with women aged 20 to 24 being less happy than those aged 15 to 19 (OR = 0.655, p < 0.001). However, the interaction between ICT use and the 25-34 age group is not statistically significant, indicating that for this age group, ICT use does not have a specific or differentiated effect on their level of happiness. This means that ICT has no particular effect on the happiness of women in this age group, compared to other age groups.

**Table 3**. Odds ratios of ordinal logistic regression models predicting self-reported happiness among Congolese women (aged 15-49), Democratic Republic of Congo's Multiple Indicator Cluster Survey (MICS- Palu 2017-2018).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Predictors of Interest | Model 5 | Model 6b | Model 7 | Model 8 |
| Multivariate | Multivariate | Multivariate | Multivariate |
| **ICT**  | 1.252\*\*\* |  1.175\*\*\* | 1.229\*\*\* | 1.131\*\*\* |
| **ICT \* Rural** | 0.901\*\*\* | 0.905\*\*\* |  |  |
|  **ICT \* (25 - 34 years old)** |  |  | 1.031 | 0.985 |
| **Residence status** |  |  |  |  |
| Urban | 1. 000 | 1. 000 |  | 1. 000 |
| Rural | 0.674\*\*\* | 0.825\*\* |  | 1.022 |
| **Marital Status** |  |  |  |  |
| In union |  | 1. 000 |  | 1. 000 |
| Not in a union |  | 0.845\*\*\* |  | 0.846\*\*\* |
| **Age\_group** |  |  |  |  |
| 15-19 |  | 1. 000 | 1. 000 | 1. 000 |
| 20-24 |  | 0.734\*\*\* | 0.677\*\*\* | 0.732\*\*\* |
| 25-29 |  | 0.655\*\*\* | 0.654\*\*\* | 0.632\*\*\* |
| 30-34 |  | 0.709\*\*\* | 0.648\*\*\* | 0.686\*\*\* |
| 35-39 |  | 0.608\*\*\* | 0.552\*\*\* | 0.588\*\*\* |
| 40-44 |  | 0.628\*\*\* | 0.511\*\*\* | 0.626\*\*\* |
| 45-49 |  | 0.698\*\*\* | 0.521\*\*\* | 0.699\*\*\* |
| **Educational attainment** |  |  |  |  |
| Pre-primary/none |  | 1. 000 |  | 1. 000 |
| Primary |  | 1.314\*\*\* |  | 1.304\*\*\* |
| Secondary |  | 1.821\*\*\* |  | 1.816\*\*\* |
| Superior |  | 3.372\*\*\* |  | 3.574\*\*\* |
| **Whether have insurance** |  |  |  |  |
| Yes |  | 1. 000 |  | 1. 000 |
| No |  | 0.648\*\*\* |  | 0.639\*\*\* |
| **Last Sexual Intercourse** |  |  |  |  |
| Number of days |  | 1. 000 |  | 1. 000 |
| Number of weeks |  | 0.942 |  | 0.942 |
| Number of months |  | 0.887\*\*\* |  | 0.886\*\*\* |
| Number of years |  | 0..671\*\*\* |  | 0.673\*\*\* |
| **Self-reported physicalhealth status** |  |  |  |  |
| Healthy |  | 1. 000 |  | 1. 000 |
| Some difficulties |  | 0.673\*\*\* |  | 0.671\*\*\* |
| Many difficulties |  | 0.333\*\*\* |  | 0.333\*\*\* |
| **Number dead children** |  |  |  |  |
| No dead child |  | 1. 000 |  | 1. 000 |
| 1-5 children dead |  | 0.794\*\*\* |  | 0.792\*\*\* |
| 6-10 children dead |  | 0.882 |  | 0.886 |
| **Whether tested for HIV** |  |  |  |  |
| Yes |  | 1. 000 |  | 1. 000 |
| No  |  | 0.959 |  | 0.953 |
| **Gender\_discrimination** |  |  |  |  |
| Already been discriminated |  | 1. 000 |  | 1. 000 |
| Never been discriminated |  | 1.844\*\*\* |  | 1.843\*\*\* |
| **Ethnic\_discrimantion** |  |  |  |  |
| Already been discriminated |  | 1. 000 |  | 1. 000 |
| Never been discriminated |  | 1.341\*\*\* |  | 1.338\*\*\* |
| **Total** | 21 756 | 12 700 | 21 756 | 12 700 |
| **Log likelihood** | **-22506.144** | **-12899.359** | **-22351.601** | **-12904.367** |

bThe Variance Inflation Factor ranges from 1.05 to 2.42.

p < .1. \*p < .05. \*\*p < .01. \*\*\*p < .001

As shown in Table 4, we have further explored the marginal effects on stratified levels of self-reported happiness that are attributed to the key predictors in our study. More specifically, marginal effects are used to understand the extent to which ICT use and the interaction terms between being in a union, residing in an urban area and belonging to an age group, increase or decrease the likelihood that Congolese women will declare themselves unhappy, fairly happy or happy. A higher frequency of ICT use, i.e. a one-unit increase in ICT use, decreases the probability of Congolese women declaring themselves not at all happy by 3.7%; in particular, it additively increases the probability of them declaring themselves happy by 5.2%, the other predictor variables being maintained at their mean. Furthermore, in line with the results in Table 2, a higher frequency of ICT use, i.e. a one-unit increase in ICT use, may reduce the probability that Congolese women in union will feel happy (0.8%; p < 0.001) and increase the probability that they will feel unhappy (0.6%; p < 0.001), keeping the other predictors at their mean level. Similarly, a higher frequency of ICT use, i.e. a one-unit increase in ICT use, reduced the probability that urban Congolese women would feel unhappy (1.7%; p < 0.001) and increased the probability that they would feel happy (2.3%; p < 0.001), keeping the other predictors at their mean level.

**Table 4**. Marginal effects by ICT,Marital statuts, Residence statuts, Age group and interaction Terms on self-Reported Hapinness among Congolese women (aged 15-49), Democratic Republic of Congo's Multiple Indicator Cluster Survey (MICS- Palu 2017-2018).

|  |  |  |  |
| --- | --- | --- | --- |
| Predictors of Interest | Unhappy | Fairly Happy | Happy |
|
| ICT | -0.037\*\*\* | -0.015\*\*\* | 0.052\*\*\* |
| **Marital Status ( 1 = In union)** |  |  |  |
| ICT \* In union | 0.006\*\* | 0.002\*\* | -0.008\*\* |
| **Residence statuts ( 1 = Urban)** |  |  |  |
| ICT \* Urban | -0.017\*\*\* | -0.006\*\*\* | 0.023\*\*\* |
| **Age\_goup** |  |  |  |
| ICT \* (15 - 24 years old) | -0.004 | -0.001 | 0.005 |
| ICT \* (25 - 39 years old) | 0.002 | 0.000 | -0.003 |
| ICT \* (At least 40 years old) | 0.001 | 0.000 | -0.001 |

Note. Results separately refer to marginal effect of each of presented variables when holding all other variables at their means.

\*\*p < .01. \*\*\*p < .001

As can still be seen in Table 4, analysis of the effects of the interaction between the ICT variable and Age\_group on the three modalities of the women's happiness variable revealed no significant results. This indicates that the effect of ICT use on women's happiness does not vary significantly according to age group. In other words, women's age does not appear to moderate the influence of ICTs on their level of happiness, suggesting that access to ICTs affects Congolese women's happiness in a similar way, whatever their age, keeping the other predictors at their mean level.

# **Discussion**

The aim of the present study was to examine whether ICT use is related to women's happiness in the Democratic Republic of Congo. The positive correlation between Information and Communication Technology (ICT) usage and women's happiness aligns with numerous studies indicating that technology access can improve subjective well-being, particularly by fostering connection and access to information. Previous research, such as that of Valkenburg et al. (2009), has demonstrated that digital engagement can enhance individuals' psychological well-being by reducing feelings of isolation and improving access to social and economic resources. In this context, our findings support the idea that ICT can empower women, providing a valuable means to enhance subjective happiness by facilitating social connection, self-expression, and access to broader networks of support and information.

Additionally, the positive interaction between ICT usage and urban residence further emphasizes the distinct advantages of ICT for women in urban settings, potentially due to better infrastructure and access to ICT resources in these areas. Urban environments often have more reliable internet connections, wider networks, and more ICT resources, which could explain why the effect of ICT on happiness is amplified for women living in cities. Research by Thapa and Sæbø (2014) corroborates this, suggesting that urban residents often reap more significant benefits from ICT use due to increased availability of ICT facilities and services. This highlights how environmental factors can shape the degree to which ICT affects well-being and points to a disparity that may require policy intervention to ensure that rural areas are not disadvantaged in terms of access to technology and its associated benefits.

However, our results reveal a negative interaction between ICT use and marital status (specifically, for women in unions), suggesting that technology might introduce specific challenges or tensions in the context of marriage. This could reflect findings from McDaniel and Coyne (2016), who note that ICT can sometimes exacerbate conflict within relationships, especially when technology use is perceived as a source of distraction or even competition within personal interactions. The negative association observed in our study may also stem from cultural or social expectations within marriages that could restrict women's technology use, as well as potential conflicts arising from differing perspectives on digital engagement within the household. Such dynamics indicate a need for further research into how marital contexts can shape and sometimes limit the perceived benefits of ICT use for women’s well-being.

Interestingly, the interaction between ICT use and age was not statistically significant, suggesting that the positive effects of ICT on happiness do not significantly vary across different age groups. This result contrasts with studies like those by Hargittai and Hsieh (2013), who suggest that digital literacy and comfort with ICT tools can differ significantly by age, potentially affecting the extent to which individuals benefit from these technologies. However, the lack of a significant interaction in our study may imply that, within the sample population, the benefits of ICT usage on subjective happiness are universally accessible across age groups, or it may reflect a convergence in digital familiarity across generations, as digital tools become more integrated into daily life for people of all ages.

These findings together suggest that while ICT can be a powerful tool for enhancing women's well-being, its impact is mediated by several sociodemographic factors. The positive influence of ICT on happiness in urban areas underscores the role of supportive infrastructure in maximizing ICT's potential benefits, while the negative correlation in marital contexts highlights the complexities of technology use within personal relationships. The universal effect across age groups indicates a broader applicability of ICT benefits, though it also signals areas for further exploration regarding age-related nuances in digital engagement. This study thus contributes to the literature by highlighting the nuanced role that context plays in moderating the relationship between ICT usage and subjective well-being among women, pointing toward the importance of tailoring ICT policies and resources to support diverse demographic groups effectively

# **Conclusions and recommendations**

It has been shown that access to information and communication technologies plays an important role in achieving the Sustainable Development Goals as developed by the United Nations in early 2015. It is also the case for the policy of “building a connected Africa” by 2030. There is empirical and theoretical evidence that access to ICTs goes beyond the achievement of development goals and improves the subjective well-being of people. But funding and investment in the infrastructure that enables connectivity is essential. Billions of public sector investments are needed to achieve universal access to broadband connectivity in Africa by 2030. Additionally, it is important to develop a legal framework, data protection policies for users, and the fight against cybercrime, in order to effectively guarantee user happiness. Previous research into the link between ICT use and population well-being has been carried out in other countries at national level or for specific sub-samples, such as the elderly (Chai and Kalyal, 2019) or teenagers (Brand, C et al., 2024). However, this study contributes to the literature by analyzing a sample of women, considering the area of residence, age groups, in a heterogeneous and unequal society, in a developing country. More specifically, the article studied the relationship between women's subjective well-being and access to ICT in the Democratic Republic of Congo, where society is heterogeneous and unequal. The article used a representative dataset from the World Bank's Multiple Indicator Cluster Survey (MICS-Palu 2018). To analyze the data, the ordered probit regression technique is used. Overall, the results support the hypothesis that there are plausible reasons for describing the use of ICTs as a desirable event that can improve women's subjective well-being, thanks to the opportunities it offers them to inform, train and participate in political and community life. However, this does not mean that women's training is automatically equated with their political participation. Rather, ICTs create a space for potential participation, without imposing formal participation, leaving women free to decide their level of participation according to their own choices and aspirations. In addition, women's use of ICT strengthens the social contacts they maintain with friends, acquaintances and families, allowing them to get in touch at lower cost and at greater distances than before; thereby reducing travel costs. The results show that this effect is much greater for Congolese women living in urban areas than for those living in rural areas; these results call for concrete recommendations to maximize the benefits of ICT for the well-being of women in the DRC. It is essential that political decision-makers implement strategies to widen access to ICT, notably by strengthening the technological infrastructure in rural areas, where women are often at a disadvantage in terms of access to information and digital resources. Investing in targeted awareness-raising and training programs in the use of ICTs could also encourage better integration of these technologies into women's daily lives, enabling them to take full advantage of the opportunities they offer.In addition, it would be useful to explore and address the complex dynamics associated with the use of ICT in the marital context. Education programs could include specific modules on digital interactions within couples, to make partners aware of the benefits and challenges associated with the use of technology. This could help create a more favorable environment for the use of ICT, thus reducing potential tensions. Finally, it is essential to continue research into the role of ICT in women's well-being, taking into account the cultural and social specificities of the DRC. Future studies could deepen understanding of the mechanisms underlying the interaction between marital status and ICT use, as well as differences in needs and expectations according to age. By integrating these dimensions into development policies and programs, the DRC will be better able to respond to women's needs and leverage ICTs to promote their happiness and overall well-being. In conclusion, while ICTs hold great promise for the well-being of women in the DRC, it is crucial to recognize and address the challenges that accompany their use to ensure a positive and lasting impact.

**Limitations**

One of the limitations of our data sample is that there are no questions concerning the structure of Congolese women's social network. The size and composition of the network, whether made up of family members, friends or either of these two groups, seems to have an important link with individuals' level of well-being (Chi and Chou, 2001). It is essential that future research includes questions about network size and composition to assess their impact on the relationship between cell phone use and perceived happiness. Previous studies have identified several elements associated with happiness, such as family ties, income, work, friends, health, freedom, etc. (Layard, 2005; Chai, X., and Kalyal, H., 2019), which cannot be established from a single query. It is important that future studies are based on questions that clearly establish the reasons for and meaning of happiness. With regard to the variable of interest in our study, the MICS survey did not ask respondents about the types of cell phones they used, resulting in a fuzzy definition of cell phones and preventing us from capturing the precise way in which the device might be used by women.

In addition, the 2010 wave of the MICS-RDC survey did not include questions on subjective perception of happiness, restricting our analysis to cross-sectional data. In future studies, a longitudinal approach with a precise definition of cell phone would be beneficial to assess whether the relationship between cell phone use and women's happiness evolves over time and, if so, to what extent marital status In union/Not in union contributes to this evolution. For example, the link between cell phone use and happiness may be weakening over time due to the Congolese government's ongoing investment in ICT development, particularly among married women, with the aim of reducing the digital disparity between married and unmarried women. These investments have the potential to increase the number of women using cell phones in couples, thereby reducing the likelihood that cell phone use will remain an important indicator of social status.

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1. [Internet users (% of population) - Congo, Dem . Rep. | Data (worldbank.org)](https://donnees.banquemondiale.org/indicator/IT.NET.USER.ZS?locations=CD) [↑](#footnote-ref-1)
2. These survey data sets can be found at http://mics.unicef.org/surveys [↑](#footnote-ref-2)