



OECD Health Working Papers No. 169

Digital and innovative tools
for better health
and productivity at
the workplace

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Digital and innovative tools for better health and productivity at the workplace

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Abstract

Promoting health and well-being at the workplace is an investment benefiting employees, employers, governments, and the whole of society. Employees in better health are less likely to be absent from work or to have impaired productivity because of sickness. Employers increase the profitability of their business with sustained and improved work outputs, and health systems benefit from reduced treatment costs if employees have better health and make use of health services less often or for less severe conditions. Digital and innovative tools enter the landscape of health and productivity management as an instrument with potential to enhance the coverage, effectiveness, and efficiency of workplace health promotion programmes.

This working paper showcases the current and potential value of digital tools and other innovative technologies for workplace health and productivity management, with a particular focus on Business-to-Business (B2B) solutions. Key findings suggest that the market for digital and innovative tools for health promotion at the workplace is expanding worldwide at different paces, with employers showing an increased interest in improving health and productivity within their companies. Four case studies focus on wearable devices, mobile apps to promote women's health, Artificial Intelligence (AI) -based apps for lifestyle management, and behavioural engagement platforms in health insurance. They showcase several opportunity areas for increasing the effectiveness, efficiency and personalisation of health promotion interventions. However, challenges remain regarding privacy concerns on the side of end-users, digital literacy necessary for consistent user engagement, about ensuring essential organisational practices for healthier workplaces, and about the safety and clinical appropriateness of the growing number of health apps and tools available in the market.

Résumé

La promotion de la santé et du bien-être au travail est un investissement qui profite aux employés, aux employeurs, aux gouvernements et à l'ensemble de la société. Les salariés en meilleure santé sont moins susceptibles de s'absenter du travail ou de voir leur productivité diminuer pour cause de maladie. Les employeurs augmentent la rentabilité de leur entreprise grâce à une production soutenue et améliorée, et les systèmes de santé bénéficient d'une réduction des coûts de traitement si les employés sont en meilleure santé et recourent aux services de santé moins souvent ou pour des affections moins graves. Les outils numériques et innovants entrent dans le paysage de la gestion de la santé et de la productivité en tant qu'instruments susceptibles d'améliorer la couverture, l'efficacité et l'efficacité des programmes de promotion de la santé au travail.

Ce document de travail présente la valeur actuelle et potentielle des outils numériques et d'autres technologies innovantes pour la gestion de la productivité et de la santé au travail, en mettant l'accent sur les solutions interentreprises (B2B). Les principales conclusions suggèrent que le marché des outils numériques et innovants pour la promotion de la santé au travail se développe dans le monde entier à des rythmes différents, les employeurs manifestant un intérêt accru pour l'amélioration de la santé et de la productivité au sein de leur entreprise. Quatre études de cas portent sur les dispositifs portables, les applications mobiles destinées à promouvoir la santé des femmes, les applications basées sur l'intelligence artificielle (IA) pour la gestion du mode de vie et les plateformes d'engagement comportemental dans le domaine de l'assurance santé. Ils mettent en évidence plusieurs possibilités d'accroître l'efficacité, l'efficacité et la personnalisation des interventions de promotion de la santé. Toutefois, des défis subsistent en ce qui concerne les préoccupations des utilisateurs finaux en matière de protection de la vie privée, la culture numérique nécessaire à un engagement cohérent des utilisateurs, la garantie de pratiques organisationnelles essentielles pour des lieux de travail plus sains, ainsi que la sécurité et la pertinence clinique du nombre croissant d'applications et d'outils de santé disponibles sur le marché.

Executive summary

In the evolving landscape of corporate wellness, **companies worldwide are increasingly recognizing the value of investing in health programmes to enhance employee health and productivity.** Leveraging digital technologies and behavioural science, these programmes offer a diverse range of interventions targeting various aspects of health, from physical activity to nutrition and stress management. However, the rapid growth of this sector is not without challenges. Issues related to data privacy, digital literacy, and health inequalities are emerging alongside various potential benefits. Through a series of case studies, this report explores the context of these innovative approaches in promoting health at the workplace and their potential benefits, while also acknowledging the complexities they introduce.

- **A growing number of companies use corporate health programmes to improve employee health, productivity and retention.** About 98% of 154 large worldwide companies responding to the 2022 Workforce Disclosure Initiative survey offer a corporate health programme while, in Europe, the proportion of companies offering nutrition awareness programmes increased from 28% to 32% between 2014 and 2019. Corporate health programmes cover a wide range of healthy lifestyles and preventable diseases, ranging from weight management to physical activity, smoking cessation, stress management and women’s health, among others. Well-designed programmes are worth the investment: previous OECD analysis showed that for every dollar spent on workplace-based programmes to address sedentary behaviour and encouraging physical activity, up to USD 4 can be returned considering both healthcare cost savings and productivity gains.
- **Digital and new technologies, such as wearable devices and artificial intelligence (AI)-driven apps, offer new opportunities for delivering health promotion at work more effectively and affordably.** New technology can facilitate programme’s delivery and management by automating labour-intensive processes such as data collection and monitoring. They can improve efficiency and reduce programmes’ costs, by reaching a wider audience than traditional programmes and allowing economies of scales. Programmes that are based on behavioural science can improve user adherence and effectiveness, for instance on physical activity.
- **Given the growing interest for companies to invest on health programmes, the global corporate health market is growing.** The size of this market is expected to grow by 50% by 2030 in comparison to 2022 levels, reaching an estimated value of USD 90 billion. Over the same period, the global market for wearable devices and health apps is estimated to reach the value of up to USD 931 billion and USD 5 billion respectively. Global venture investment on digital health reached USD 57 billion in 2021. Many factors underpin this growth with contextual drivers, such as an ageing workforce and rising obesity levels, being identified as main drivers for the raising demand for health promotion.
- **While digital and innovative tools can foster the development of corporate health initiatives, they also bring challenges in several areas including personal data management, digital and health literacy gaps and the risk of being inappropriate solution to poor working conditions.** For example, 42% of the people in the United States fear that their data could be sold without their consent and 38% are afraid of identity or personal information theft. Across European

countries, about 45% of adults do not have basic digital skills, which hinders the effective use of digital technologies and may widen health inequalities. Regarding health literacy, one in four people across OECD countries find it difficult to improve their health. In addition, there is a risk that digital and innovative tools may be unduly seen as a quick fix solution for health promotion at work that can decrease the attention on ensuring safe and decent working conditions and a healthy workplace culture that remain essential issues.

- **Four case studies showcase the potential of digital technology and behavioural science-based programmes in helping employers promoting health and well-being at the workplace:**
 - **Wearable devices help users become more physically active and monitor programmes.** Wearable devices such as smartwatches are effective in increasing daily physical activity levels. For instance, wearable activity trackers increase physical activity levels by around 1800 additional steps per day, 40 additional minutes of daily walking and reductions of approximately 1 kg in bodyweight, with benefits lasting for at least 6 months.
 - **Femtech is a field developing technology to address women’s health problems that can affect their well-being and productivity.** Women facing health conditions such as pre-menstrual syndrome and menopause – conditions that often go unnoticed or unrecognised as health problems- may also experience reduced work productivity. Introducing a workplace women’s health programme facilitating access to specialised education, care and medication has helped Japanese companies improve the quality of life of their female employees which also had positive effects on absenteeism (-0.2 days over a period of six months) and self-assessed productivity.
 - **Apps using artificial intelligence (AI) make personalised health guidance for better diet, sleep and physical activity more accessible.** Personalisation entails matching better the needs of specific workplaces and sub-groups of workers but this usually requires important human and financial resources. A study including employees of four Japan-based companies showed that users of an AI-based app lost 1.8 kg on average in 3 months. AI-based apps reduce the personnel and financial burden of delivering corporate health programmes by automatising aspects of data collection and counselling.
 - **Behaviour-based programmes can increase user engagement in corporate health promotion activities, however they carry a selection risk and may exacerbate health inequalities.** Behavioural science-based programmes rewarding people for eating healthy and doing sports improve the health of employees and reduce healthcare costs. Participants of the Vitality insurance scheme collect points by engaging in health-related activities and can trade their points for various benefits such as discounts and subscriptions to services offered by programme partners. In comparison with less engaged peers, more engaged employees showed 35% lower aggregate turnover rates, a 4% reduction in medical claims and a 3.65 percentage points increase in work performance. However, healthier individuals are more likely to join and engage actively in programmes than less healthy individuals, potentially widening health inequalities.

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List of acronyms / abbreviations

AI	Artificial intelligence
B2B	Business-to-Business
CAGR	Compound annual growth rate
CIPD	Chartered Institute of Personnel and Development
ESG	Environmental, Social and Governance
EU	European Union
EUR	Euro
G20	The Group of Twenty
GBP	Great Britain Pound
JPY	Japanese Yen
METI	Ministry of Economy, Trade, and Industry
OECD	Organisation for Economic Cooperation and Development
USD	United States Dollar

1. Introduction

1. The work environment presents significant opportunities to improve employees' health and productivity. In the OECD, approximately 76% of individuals aged 20-64 spend about one-third of their daily life in the workplace. The quality of this workplace environment has a proven impact on the mental health of employees, as well as on cardiovascular and musculoskeletal diseases (EU-OSHA, 2023^[1]; OECD, 2024^[2]). Previous OECD analyses found that many different factors in the workplace can impact worker's health (OECD, 2022^[3]). Some of the most critical dimensions identified include the work environment and job quality, such as long working hours and job strain. Across Europe, workers with a poor working environment (40%) were twice as likely to report that work hurt their health than workers in a good working environment (15%) in 2015. Stress affected two in four employees across OECD countries in 2017-19 (OECD, 2022^[3]).

2. Unhealthy lifestyles and chronic diseases harm workforce productivity. Obesity, smoking, harmful alcohol consumption, and high levels of stress are major risk factors for chronic diseases that can alter quality of life, lead to impairments, and may limit participation in social activities and work. OECD analyses found that individuals having unhealthy lifestyles and chronic conditions are less likely to be employed, are absent from work more often, and have higher presenteeism levels (i.e. reduced productivity while at work due to impaired health) (OECD, 2022^[3]). Specifically, in European countries, individuals with chronic conditions report seven days more of work absence per year than those in good health (Feigl et al., 2019^[4]). Similarly, poor mental health negatively affects workforce productivity, with losses equivalent to 12 billion lost working days globally per year (WHO, 2022^[5]). An ageing population and the prevalence of multimorbidity (i.e., living with multiple chronic diseases) further exacerbate the problem.

3. Corporate health prevention programmes are gaining attention from employers, while new technologies, such as mobile apps and smartwatches, are changing how workplace health promotion programmes are delivered. Corporate health promotion programmes (shortened as corporate health programmes in the rest of this paper) include activities organised by employers and human resource leaders to improve employees' (physical and mental) health and productivity and to enhance corporate image. Effective workplace interventions targeting unhealthy lifestyles and chronic diseases can increase workforce productivity and generate more comprehensive benefits for companies and society. For instance, a previous OECD analysis found that scaling up a workplace-based intervention to address sedentary behaviours and encourage physical activity would improve employment and reduce absenteeism and presenteeism by adding to the workforce the equivalent of 37 000 full-time workers per year in 30 OECD countries (OECD, 2019^[6]). As new technologies develop, digital and innovative tools have entered and reshaped the market of corporate health programmes, offering new opportunities and risks associated with their utilisation.

4. The previous OECD report *Promoting Health and Well-being at Work* (OECD, 2022^[3]) delved into several dimensions of workplace health promotion policies, regulations, and initiatives. Still, it did not propose a specific focus on digital and innovative tools. To fill that gap, this study analyses digital and innovative tools as part of corporate health programmes and presents four case studies showcasing digital and innovative tools for corporate health. Two main sections compose this document: section 2. presents the potential of corporate health programmes and offers an outlook on the digital and innovative solutions for health promotion at work, exploring market growth, different stakeholders, opportunities, and risks.

Section 3. presents four case studies on corporate health solutions, focusing on wearable devices, women's health, artificial intelligence-based tools for lifestyle management, and behaviour-based insurance platforms. The evidence to inform this document was retrieved through a literature review and structured interviews with corporate health services providers and researchers.

2. Digital and innovative solutions offer new opportunities for corporate health programmes but also pose challenges in terms of privacy, and health and digital literacy.

5. This section starts with (i) a description of the effectiveness of corporate health programmes and the extent to which employers are adopting them; (ii) it then presents the opportunities of digital and innovative tools as means to promote health at work; (iii) it examines the corporate health market, with a focus on new technologies, looking at market size and trends and the different stakeholders. Finally, (iv) it explores the challenges that may contribute to or hinder the further development of the corporate health market.

2.1. Corporate health programmes gain attention from employers.

2.1.1. Corporate health programmes are viewed as a way to enhance employee health, productivity, and retention and to promote a positive corporate image.

6. **Corporate health programmes improve employee health and productivity.** Better health leads to decreased presenteeism and absenteeism and reduced healthcare costs, yielding net benefits for employees, employers, and society. For absenteeism, corporate health programmes can reduce sickness absence by approximately one hour per employee per year (Mattke et al., 2014^[7]) and are associated with an average 25% reduction in sick leave absenteeism (Chapman, 2012^[8]). In monetary terms, a meta-analysis of 22 studies found that for every dollar spent on corporate health programmes, employers can save USD 2.7 in absenteeism costs and USD 3.3 in medical costs (Baicker, Cutler and Song, 2010^[9]). Other recent studies show similar findings. For example, a study from the United States on the return on investment of corporate health programmes with components for disease management (e.g., diabetes) and healthier lifestyles (e.g., physical activity) suggests that such programmes generate savings in healthcare costs in the tune of USD 1.5 for each dollar invested (Mattke et al., 2014^[7]). Similarly, another study assessing interventions addressing sedentary behaviour and encouraging physical activity at the workplace calculates a return of USD 4 for each dollar invested when healthcare and work productivity costs are considered (OECD, 2019^[6]).

7. **Health and well-being programmes are also associated with higher market capitalisation.** For instance, in the United States, between 2001 and 2014, the stock value of companies recognised for their corporate health programmes increased up to three times more than that of companies comprising

the Standard & Poor's 500 Index. In Japan, between 2011-2021, the stock value of the group of companies selected for the Health and Productivity Stock Selection in 2021 outperformed the average of companies in the Tokyo Stock Exchange (OECD, 2022^[3]). Higher market capitalisation in companies with health programmes might be driven by several factors. First, having such programmes in place helps companies achieve human capital goals and fulfil their social responsibility. Socially responsible companies with highly performing human capital may attract investments from funders prioritising environmental, social and governance (ESG) criteria¹. Second, improved employee health-related behaviours may have a positive effect on work productivity and the company's profits, which in their turn can attract investors and increase market capitalisation. For instance, a study from Japan using data from the KENKO Investment for Health survey from years 2014 to 2021 suggests that corporate profit is associated with the proportion of workers who regularly exercise, do not smoke, and sleep well (Yano et al., 2022^[10]).

8. **Corporate health programmes also help improve corporate image and ability to attract and retain talent** (EU-OSHA, 2012^[11]; OECD, 2019^[12]). Young workers value benefits like corporate health initiatives when evaluating potential employers. In a 2023 survey covering workers aged between 24 and 35 years old, 42% of respondents valued quality of benefits which was among the top four factors when considering a new employer together with salary, opportunities of promotion, and flexible work arrangements (de Cervens, Crain and Hutchins, 2023^[13]). In addition, corporate health programmes can increase employee satisfaction, which is linked to performance. A comprehensive meta-analysis of over 300 studies found that employee job satisfaction was significantly associated with productivity ($r = 0.2$) and with customer loyalty ($r = 0.31$), while it was negatively correlated with staff turnover ($r = -0.25$) (Krekel, Ward and De Neve, 2019^[14]).

2.1.2. More employers are offering corporate health programmes to their employees.

9. **More employers are offering corporate health programmes to their workforce.** Across Europe, 32% of the companies responding to the European Survey of Enterprises on New and Emerging Risks reported they implemented measures raising nutrition awareness among employees in 2019, compared to 28% in 2014 (ESENER, 2019^[15]). In the United States, almost one in two (46%) employers offer some corporate health programme, often focusing on physical activity, nutrition, and stress reduction (Centers for Disease Control and Prevention, 2018^[16]). An OECD analysis of the 2022 Workforce Disclosure Initiative - a survey covering 154 large companies - shows that 98% of surveyed companies reported offering a health and well-being programme, and 94% of 117 declared that they integrated mental health safeguarding into job design and workplace conditions.

10. The business-to-business (B2B) corporate health market is witnessing a surge in demand as more firms are keen to adopt corporate health initiatives². Wellness programme providers and health insurance companies are at the forefront of this trend, introducing cutting-edge solutions that leverage digital technology and artificial intelligence to improve employee health, well-being and productivity. Section 4 provides examples of these innovative solutions. Employers and human resource management professionals are evaluating these solutions to reduce absenteeism and turnover rates and to boost productivity.

¹ Environmental, Social, and Governance (ESG) frameworks are non-financial frameworks that evaluate a company's performance considering the impact of its activities on the environment, health, and well-being of its clients, employees, providers, and society. These frameworks guide investors seeking to invest in companies showing environmental and social responsibility, for instance.

² The business-to-business (B2B) corporate health market is the set of goods and services aimed at improving health, well-being, and productivity of the workforce that are offered by one company to another, as opposed to business-to-retail where goods and services are sold from a company to an individual consumer.

2.2. Increasing attention to corporate health programmes and digital solutions underpins the growth in the global market for corporate health promotion activities.

11. The analysis presented herein focuses on the corporate health market for health promotion activities, excluding health insurance such as group health plans.

2.2.1. Population dynamics such as ageing and obesity and the rise of digital tools for health promotion shape the corporate health market.

12. **Contextual and market drivers steer the demand for corporate health services.** On the one hand, contextual drivers include the epidemiological dynamics of the population, such as ageing and trends in obesity, smoking, and sedentary habits. The workforce is ageing: by 2050, the share of the population aged 50 and older will increase from 37% in 2022 to 44% on average across OECD countries (OECD, 2024^[17]). Older workers are more likely to live with one or multiple chronic diseases that limit their participation in work and social activities. Obesity rates are growing in OECD countries, causing diabetes, cardiovascular and other chronic diseases. These diseases reduce workforce productivity by 54 million fewer full-time workers across 52 OECD, EU, and G20 countries, similar to the number of employed persons in Mexico (OECD, 2019^[6]). Such trends affect the incidence of diseases and reduce workforce productivity and employment, triggering employers' demand to initiate or scale up health and productivity management programmes. On the other hand, market drivers are related to the evolution of the goods and services offered within the corporate health market, especially the entry of new technologies. As technology develops and the market for digital health tools expands (Box 2.1), the cost of introducing corporate health services can decrease, increasing the products' affordability and cost-effectiveness potential.

Box 2.1. The rapid growth of digital and innovative tools for health.

13. **The market value of wearable devices and health apps is expected to grow significantly in the coming years.**

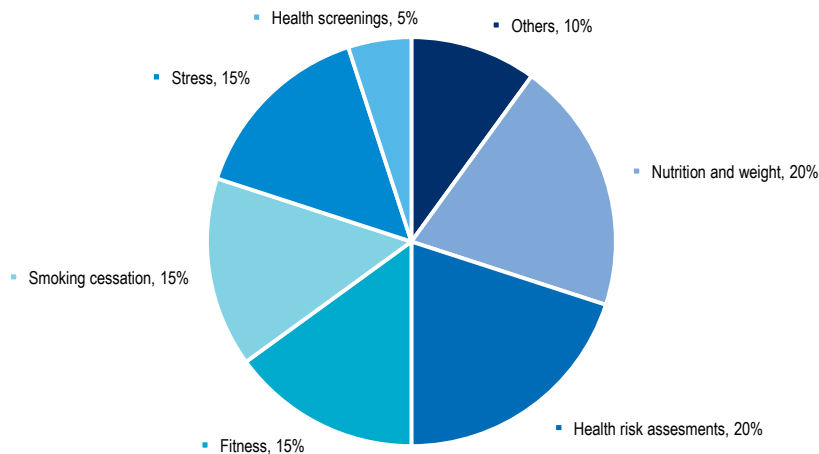
14. The global market value of wearable devices was estimated to be between USD 61.30 billion and USD 115.8 billion in 2021-22, with a projected compound annual growth rate (CAGR) between 14.6% and 33.9%. The market is expected to reach a value of up to USD 931.31 billion by 2030 (Research, 2021^[18]; Fortune Business Insights, 2022^[19]; Allied Market Research, 2021^[20]).

15. In addition, the global value of the market for health and fitness apps was estimated to range between USD 1.21 billion and USD 1.54 billion in 2021-2023. It is projected to grow at a CAGR of 17.7% to 18.1%, reaching a value of up to USD 5.41 billion by 2030 (Grand View Research, 2023^[21]; Wellness Creative Co, 2023^[22]; Straits Research, 2022^[23]).

16. **The size of the global corporate health market is expected to grow by 50% by 2030.** The market size of corporate health activities is estimated at USD 60 billion in 2022. This estimate ranges from 50 to 65 billion and is expected to reach USD 90 billion, ranging from 80 to 110 billion, in 2030 (Grand View Research, 2022^[24]; Market.us, 2023^[25]; Precedence Research, 2020^[26]), corresponding to a 50% increase over the next six years. About 40% of the global market concentrates in North America. The Asia Pacific and European regions have 20% of the market each, and Latin America, the Middle East and Africa account for 10% each (Precedence Research, 2020^[26]).

17. **The global corporate health market can be segmented in seven major services families.** Health risk assessments account for 20%, nutrition and weight management services have a share of 20%, fitness, smoking cessation, and stress management services have a share of 15% each, health screenings represent 5% of the market, and other types of goods and services account for the remaining 10% (Figure 2.1) (Precedence Research, 2020^[26]).

Figure 2.1. Share of products and services within the corporate health market by type.

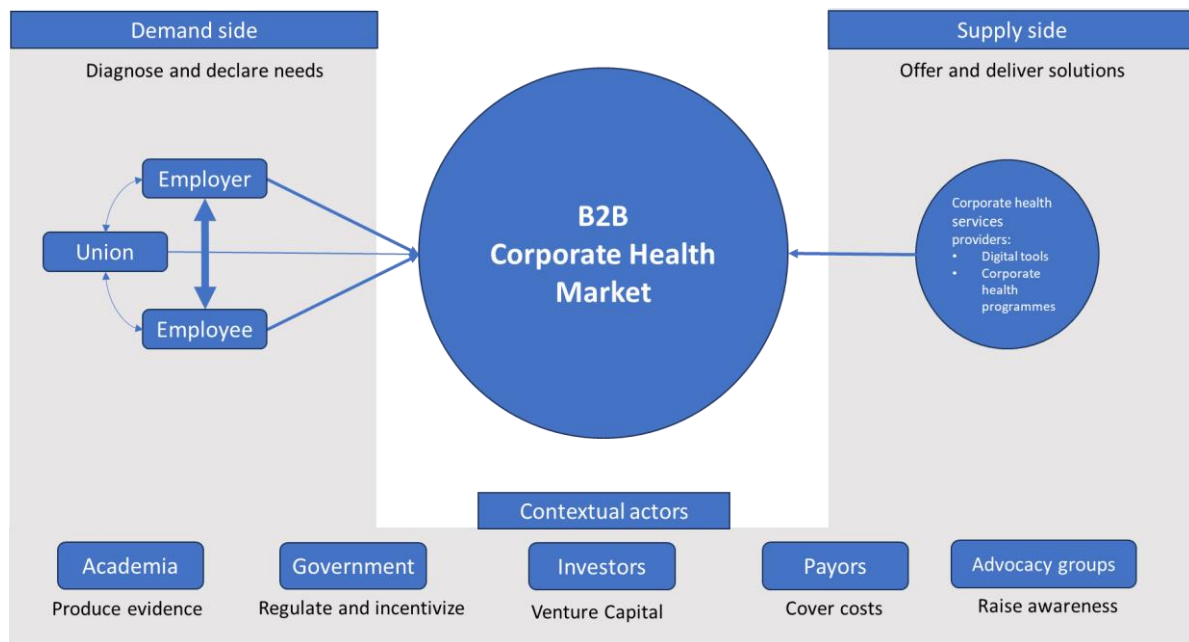


Source: Precedence Research, (2020^[26]) Corporate Wellness Market Size, Share and Growth Analysis Report, [...] 2021-2030, <https://web.archive.org/web/20231211092750/https://www.precedenceresearch.com/corporate-wellness-market>

2.2.2. Several key stakeholders participate in the corporate health market, with digital health solution providers, researchers, and investors steering the supply of digital and innovative tools.

18. The corporate health market is composed comprises employees, employers, and health services providers, alongside other stakeholders, such as researchers, governments, payors, advocacy groups, and investors. The interactions between stakeholders create the demand and supply sides of the corporate health market (Figure 2.2).

Figure 2.2. A dynamic system of multiple stakeholders and drivers steers the corporate health market



Note: B2B stands for Business-to-Business.

19. Employers are the main stakeholders, as purchasers of corporate health services. In addition to the employers, other actors, such as trade unions or individual employees may create demand for corporate health services. Unions play a role strengthening employee-employer relations, championing safety and health at the workplace, and promoting the health and well-being of the workers they represent. Some research suggests that workplaces with a trade union health and safety committee have half the injury rate of workplaces where employers manage health and safety exclusively (Reilly, Paci and Holl, 1995^[27]). Employees, as end-users, benefit directly from better health, leading to a better quality of life and increased life and job satisfaction.

20. On the supply side, corporate health services providers, such as wellness companies and digital health solution providers, are the main actors. Some work exclusively under a B2B framework, offering services directly to companies, whereas others focus on end-users, with part of their offer tailored to corporate clients.

21. Researchers contribute with evidence on the economic case for investing in corporate wellness, showcasing the potential benefits of corporate health programmes and digital and innovative health promotion and prevention tools in different settings. For instance, Japan has undertaken several actions to promote and spread KENKO Investment for Health. These actions include supporting academic research, promoting the development of a reliable accreditation system managed by the private sector, and implementing governmental support and policy campaigns to promote health at work (Box 2.2). Along similar lines, private companies producing digital tools for health, can finance academic research that can back up the purported value of the products they propose. For example, companies have built a repository of research conducted using their wearable devices, comprising more than 700 publications covering several applications, including sleep research, physical activity, stress management and weight management, to mention a few examples (Garmin, 2024^[28]).

Box 2.2. Occupational health research impacts workplace health promotion policy in Japan

22. The OECD interviewed Professor Koji Mori, chair of Japan's Ministry of Economy, Trade, and Industry (METI) advisory group on Health and Productivity Management, to gain insights about the role of academia in developing of workplace health promotion policy. The demographic context of Japan and data availability, among other factors, enable occupational health research in the country:

- With an ageing and shrinking population and little inflow of foreign workers, employers in Japan seek to maximise employees' health and job satisfaction. The government, in turn, is interested in ensuring the financial sustainability of the health and social security systems.
- The Japanese context is rich in data which facilitates research on occupational health. The Industrial Health and Safety Law requires workers to undergo yearly health checkups. Medical insurers often manage information on health expenditure for companies. Additionally, through the KENKO Investment for Health initiative, companies disclose information about their practices around workplace health promotion. These data are interoperable and can be used for research as long as the Personal Information Protection Law is abided by.

23. Academic research on occupational health has been key to developing the KENKO Investment for Health initiative in Japan, with scientists constantly accompanying the METI initiatives in the field.

24. Payers, such as insurance companies or governmental institutions, are interested in promoting and supporting the introduction of corporate wellness programmes to reduce the incidence of diseases, reduce healthcare expenditure and improve prospective risks and costs in their portfolios. For example, the insurance-led Vitality Programme (Section 3.4) rewards employees with discounts on health and wellness services, as well as hotel reservations, and travel when employees engage in activities that improve and sustain health and well-being. Another example is the statutory health insurance in Germany, which encourages health promotion at the workplace (Box 2.3).

Box 2.3. Statutory health insurance in Germany plays a crucial role in promoting health at the workplace.

25. In Germany, statutory health insurance is pivotal in promoting workplace health. It particularly encourages the establishment of health-promoting structures within companies. A key initiative in this regard is establishing a digital platform known as "BGF Koordinierungsstellen". This platform offers comprehensive support to companies in workplace health promotion. It provides a free initial consultation to companies, focusing on small and medium-sized enterprises, helping them set up Workplace Health Promotion.

26. Publicly funded health insurance also supports implementing digital solutions for workplace health promotion. Key priorities are to ensure awareness of the risks of data management and comprehensive protection of users' rights to their data.

27. Investors influence the corporate health market by choosing the assets to include in their portfolios. For instance, venture capital investments play a key role in the development of the market for digital and innovative health tools (Box 2.4). ESG investors seeking to invest in socially responsible companies may also trigger the employer's demand for corporate health programmes.

Box 2.4. Venture capital plays prominent role in developing the digital and innovative health tools market.

28. Venture capital is financial capital provided by investors -including governments, corporations and individuals- to high-potential and high-risk businesses. Digital and innovative tools, including mobile apps and wearable devices, are evolving fast and are increasingly used for health and well-being. This opportunity has been seized in recent years by venture capital investment, becoming an important factor in the sector's development. In 2021, digital health start-ups in the United States raised a record USD 29.1 billion across 729 deals (Rock Health, 2022^[29]). Globally, in the same year, digital health funding reached an all-time high of USD 57.2 billion across 2,930 deals (Landi, 2022^[30]; CB Insights, 2022^[31])

29. Investments slowed down in 2023, following general trends of venture capital funding, with annual venture funding for digital health closing out at USD 10.7 billion raised across 492 deals (Rock Health, 2024^[32]). Governments can further stimulate venture capital investment through funding, financial incentives, regulatory reforms, and partnership models. However, these initiatives require careful management to avoid pitfalls, such as making poor investment choices due to a lack of expertise (Lerner et al., 2021^[33]).

30. Governments can support the development of the corporate health market in several ways. Across several OECD and non-OECD jurisdictions, governments incentivise employers to promote health and mental well-being through labour legislation, financial incentives, and guidelines. Alongside private entities, governments might also promote certification and awards schemes, as with the Health and Productivity Stock Selection promoted by the Ministry of Economy, Trade, and Industry of Japan (OECD, 2022^[3]). By using other tools, such as incentives for venture capital investment or taking on the funder role, governments can help create a positive environment for investment in digital and innovative tools for health.

2.3. Digital and new technologies, such as wearable devices and artificial intelligence-driven apps, offer new opportunities to promote health at work.

31. Digital and innovative tools used for health promotion include mobile apps and wearable devices (e.g. smartwatches, fitness trackers, smart rings and virtual/augmented reality headsets). Many of these technologies usually rely on behavioural science to motivate and incentivise users to adopt healthier lifestyles. Tools based on artificial intelligence (AI) can collect, process, and analyse the data, as well as provide personalised health messages and guidance. **The potential for digital and innovative tools in the field of health prevention and promotion is vast.** Figure 2.3 outlines opportunity areas of digital tools in the delivery and administration, efficiency and cost reduction, and engagement and adherence of workplace health promotion programmes, which are explored further below.

Figure 2.3. Digital and innovative tools present opportunities for leveraging health promotion at work



Source: Authors.

32. The thematic domain of digital and innovative tools encompasses weight management, physical activity, smoking cessation, stress management, women's health, and several other health areas. Table 2.1 presents areas of health-related services included within workplace health promotion, together with examples of digital and innovative tools. Most of these areas relate to lifestyle risk factors for chronic diseases.

Table 2.1. Examples of digital and innovative tools to address lifestyles and preventable diseases.

Corporate health initiatives span many aspects of health and well-being.

Area	Description	Examples
Health literacy improvement	Enhancing employees' understanding of health information and medical terms.	Online training seminars, digital learning platforms.
Oral health	Promoting good oral hygiene and regular dental checkups.	Dental checkups, distribution of toothpaste and toothbrushes, interactive training for learning proper brushing techniques
Measures against alcohol	Managing and preventing excessive alcohol consumption.	Dependency self-checks, apps to track drinking habits and support responsible drinking.
Early detection and understanding of health conditions	Encouraging regular health screenings for chronic diseases.	General health checkups, physical examinations, digital platforms to deliver health checkups.
Self-management	Empowering employees to take charge of their own health and wellness.	Wearable devices, health management apps, smart scales and other measurement devices
Physical activity	Encouraging regular exercise and movement throughout the workday.	Access to fitness clubs, fitness apps, trainers.
Tobacco control	Implementing policies to discourage tobacco use and support quitting efforts.	Smoking cessation programmes, apps to manage smoking habits and support quitting, nicotine patches.
Diet and nutrition	Promoting healthy eating habits and providing nutritious food options.	Employee cafeterias, dietary management apps, nutritional guidance, access to healthy foods.
Mental health	Fostering a supportive work environment that prioritises mental well-being.	Stress checks, behavioural and cognitive-behavioural therapy, online and digital counselling, apps for developing positive

		coping skills.
Sleep habits	Improving sleep quality by promoting good sleep hygiene and habits.	Sleep management apps, sleep hygiene counseling.
Preventive measures against infectious diseases	Implementing strategies to prevent the spread of infectious diseases in the workplace.	Immunisation, hygiene products.
Musculoskeletal diseases	Focusing on preventing and managing musculoskeletal disorders through ergonomic interventions and physical activity.	Ergonomic equipment, physical therapy.
Women's health	Addressing unique health concerns of women.	Menstrual cycle management apps, gynaecological services, sanitary products.
Work environment	Creating a safe and healthy work environment to enhance employee well-being and productivity.	Organisational climate diagnostic tools, teleworking benefits, support to balance work and medical treatment.

Source: Authors using sources provided by METI.

33. **Digital tools can facilitate the delivery and administration of corporate health promotion programmes.** AI-based tools alleviate the burden of labour-intensive processes such as data collection, analysis, monitoring and evaluation of programmes. They can also help deliver more personalised prevention interventions. For instance, AI-based applications can analyse data provided by the user, such as height, body weight, physical activity and dietary habits, to provide the user with personalised guidance on improving cardiovascular health (Aggarwal et al., 2023^[34]). Wearable devices collect biometric data and provide feedback to users in a direct and timely manner, **simplifying intervention delivery, monitoring and evaluation** (Hernandez et al., 2021^[35]; Hasan, Klintworth and Hajat, 2021^[36]; Wu, Hou and Zhang, 2022^[37]). Case studies in Section 3 illustrate the potential of digital tools integrated into corporate health programmes. For instance, an AI-based application can support women's health and generate advice to be adjusted and validated by qualified professionals (section 3.2). Weight management is another example. Users who want to manage their weight can track their food consumption in a mobile app and estimate the consumed calories and nutritional contents (section 3.3). In addition, using a smartwatch can record the physical activity level and estimate the burnt calories. The smartwatch and mobile app provide real-time feedback about dietary choices or remind users to stay active (see section 3.1).

34. **Digital and innovative tools can improve corporate health programmes' efficiency and reduce overall costs.** Corporate health programmes could achieve this mainly by allowing interventions to reach a wider audience and leveraging economies of scale through mobile apps. In broader settings, evidence suggests that digital health interventions have positive effects on intervention costs (Gentili et al., 2022^[38]) and that they are cost-effective (Thai et al., 2023^[39]). There are, on average, 128 mobile broadband subscriptions per 100 inhabitants across OECD countries (OECD, 2022^[40]). Assuming that the number of mobile broadband subscriptions is linked to the number of smartphone owners, health apps can reach more participants than traditional interventions (Druce, Dixon and McBeth, 2019^[41]). Additionally, digital technologies can automate some aspects of corporate health programme implementation, such as survey administration and data management, reducing the resources needed and lowering implementation costs.

35. **Artificial intelligence and behavioural science can increase adherence to interventions.** Digital and innovative tools frequently rely on behavioural science-based approaches that encompass, for instance, feedback and monitoring to inform users about their progress in attaining their health goals, rewards to incentivise users for their achievements and goal setting to nurture a feeling of advancement and bolster user engagement (Edwards et al., 2016^[42]). Research suggests behavioural science techniques could positively impact user engagement (Voorheis et al., 2022^[43]) and health outcomes such as physical activity levels. Advancements to refine and further develop behavioural science-based algorithms, along with more advanced, affordable, and accessible devices entering the market each year, represent the most innovative aspects of the current corporate health market.

2.4. Several factors challenge a wider adoption of digital and innovative tools.

36. The main challenges related to the broader adoption of digital and innovative tools in the corporate health market include trust around personal data management, a low level of digital and health literacy, the risk of being mistaken for quick-fix solutions, and concerns about the clinical appropriateness and safety of apps (Figure 2.4).

Figure 2.4. Digital and innovative tools present challenges that may limit their effectiveness in promoting health at work.



Source: Authors.

2.4.1. Users are concerned about how health apps and tools manage their data.

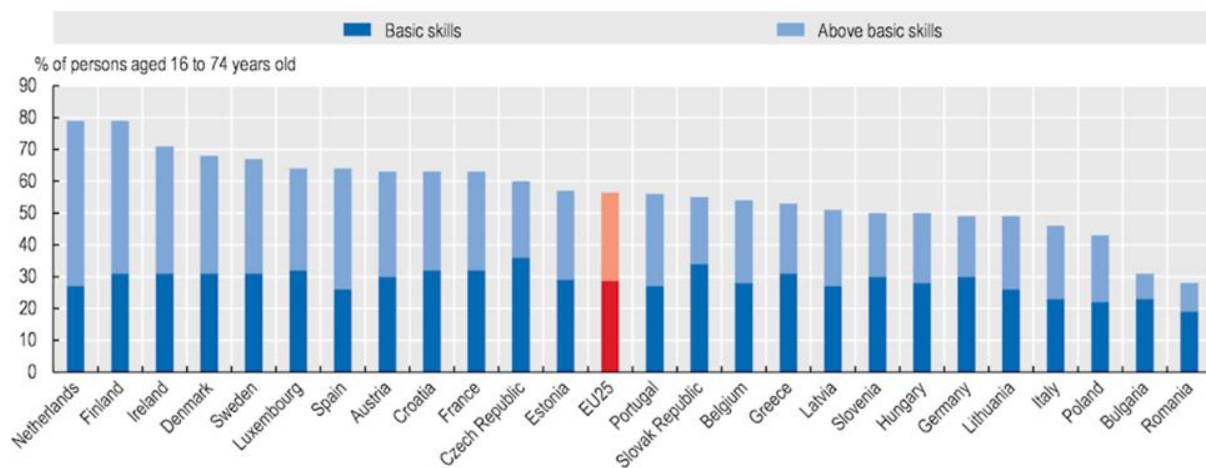
37. **Creating trust around data management is essential to advance the use of digital tools further.** In many countries, such as European Union member states, standard data protection regulation requires data handlers to inform users about which data will be collected, for which purposes and, to commit not to share data with third parties unless this is explicitly authorised by users. These regulatory frameworks aim to encourage appropriate and safe data use, and to build public trust. However, some users might still doubt that service providers comply with regulations, which may prevent them from engaging in corporate health programmes. For example, 42% of people in the United States feared that data handlers might sell users' data without consent (Mcclain et al., 2023^[44]). Users also reported fear of being discriminated against at the workplace if employers used data to infer conditions such as their sexuality, pregnancy status, or mental or physical health (Brassart Olsen, 2020^[45]). In a study from New Zealand, users reported fear of sharing their health data due to potential misuse by third parties (e.g. insurance companies) and discrimination for their physical and mental health conditions (Madanian et al., 2023^[46]). The risk of cybercrime is another concern often cited by users. In the United States, 38% of the people reported being afraid of identity or personal information theft (Mcclain et al., 2023^[44]). Despite of the risks, research reports that the public is usually optimistic about their data being used for individual and collective benefit when the concerns above are addressed (Gerdon et al., 2021^[47]).

2.4.2. Low levels of digital and health literacy can limit the adoption of digital corporate health programmes.

38. **Digital and health literacy are among the main barriers identified by users of digital tools** (Madanian et al., 2023^[46]). About 45% of adults across European countries lack the fundamental digital

skills necessary to use digital and innovative tools (Figure 2.5). Furthermore, the recent OECD Skills Outlook shows very low levels of health literacy across the population, with more than one in four persons in the OECD finding it difficult or very difficult to make decisions to improve health and well-being (OECD, 2023^[48]). These challenges are likely to be mirrored in workplace settings. Addressing them could pave the way for the broader adoption of digital and innovative tools for promoting health in the workplace.

Figure 2.5. Digital skills of the adult population in European countries in 2021



Source: (OECD, 2023^[49]), adapted from (ILA, 2023^[50]), Digital Health Literacy Country Reports.

2.4.3. There is a risk that digital and innovative tools may be seen as a quick-fix to problems that only good working conditions and healthy work cultures can address.

39. **Corporate wellness programmes cannot compensate for other shortcomings in working conditions.** For mental health, for example, corporate health initiatives such as workplace counselling and resilience workshops might not be sufficient to offset overwhelming job demands causing excessive stress and burnout (Fleming, 2024^[51]). Moreover, a positive organisational climate comprising positive leadership and supervision, and good relationships between co-workers have been associated with positive employee mental health outcomes and lower levels of burnout, depression and anxiety (Bronkhorst et al., 2015^[52]). Research also suggests that other aspects of working conditions, such as work-life balance, allow for healthier lifestyles overall, with people having sufficient time for physical activity, healthy eating and social interaction (Borowiec and Drygas, 2022^[53]; Bronkhorst et al., 2015^[52]) This considered, digital and innovative solutions should not be adopted in isolation nor be seen as one-size-fits-all solutions for improving employee health and well-being.

40. Digital and innovative tools should instead be **part of comprehensive organisational efforts ensuring safe and decent working conditions.** Strong occupational health and safety management systems are the cornerstone of effective workplace health promotion strategies. Approaches such as Total Worker Health[®] are good examples of such comprehensive strategies. The Total Worker Health[®] approach prioritises hazard-free work environments. It overtly recognises wages, work hours, workload, interactions with colleagues and supervisors, and paid leave as determinants of health with substantial impact on individual, family, and community health (NIOSH, 2020^[54]). Previous OECD work (OECD, 2022^[3]) has analysed in detail how these and other dimensions of working conditions impact workers' health and productivity, and signalled some interventions to promote health and well-being effectively (Box 2.5).

Box 2.5. The determinants of health and productivity are complex and interlinked.

41. The correlation between working conditions and well-being is vital to occupational health. Working conditions can significantly impact health, and, in turn, health conditions can influence employment and productivity. There are no universal solutions to improving workers' health and well-being. The OECD report *Promoting Health and Well-being at Work: Policy and Practices* (OECD, 2022^[3]) delved into the relationship between work and health, including the following aspects:

- **Work and health:** Employment is not merely a source of income. It has substantial health implications. The relationship between work and health is bidirectional - employment and work conditions can significantly affect health, and health conditions can reciprocally influence employment opportunities and productivity.
- **Work environment:** The environment in which work is performed is a critical determinant of health outcomes. Adverse work environments can harm health, with individuals in poor working conditions being more likely to report adverse health impacts attributable to their work.
- **Job quality and strain:** The quality of employment and the strain it imposes can be a significant risk factor for ill-health. High job strain, characterised by low autonomy and high workplace conflicts, can precipitate stress and other health issues.
- **Socio-economic status:** Socio-economic status can shape the nature of employment, thereby contributing to health disparities. Individuals of lower socio-economic status often find themselves in less secure and lower-quality jobs, which can adversely impact their health.

2.4.4. Ensuring health apps' safety and clinical appropriateness remains a challenge.

42. Health apps' safety and clinical appropriateness are paramount. If health apps are not properly designed and regulated, they can pose significant user risks. For instance, incorrect or incomplete data to feed an AI model, variation in contents, and inaccurate or inappropriate responses to consumer needs can lead to potential harm (Akbar, Coiera, and Magrabi, 2019^[55]).

43. The Dataset Nutrition Label is an initiative to improve the quality of data for developing such apps. This initiative provides context for datasets and enhances their legibility by providing a comprehensive overview of dataset "ingredients" before AI model development. By highlighting the 'ingredients' of a dataset, the Dataset Nutrition Label helps shed light on whether the dataset is fit for a particular statistical use case. This can lead to more reliable health advice from apps, as the quality of the data they use directly impacts the quality of the advice they provide (Holland et al., 2020^[56]). Thus, initiatives like the Dataset Nutrition Label, alongside involvement of consumers, regulators, and healthcare professionals in app development can improve quality, and mandatory reporting of safety concerns can improve outcomes (Akbar, Coiera, and Magrabi, 2019^[55]).

2.4.5. The digitalisation of work might indirectly impact mental health and well-being.

44. The digitalisation of work leads to meaningful changes in the work environment, which could impact on workers' health. For example, algorithmic management - using computer algorithms to collect data about workers' behaviours and support automated or semi-automated management decisions (Urzi Brancati et al., 2022^[57]) - can lead to increased efficiency and productivity. Still, it also poses risks such as work intensification, psychosocial stress, security and privacy risks, potential job displacement and injury during employment (Howard, 2022^[58]). The digitalisation of work can negatively impact health and well-

being by blurring the boundaries between work and personal life due to constant connectivity. The resulting 'techno-stress' can manifest in various ways, including feeling overwhelmed by the amount of information and communication, feeling pressured to respond immediately to work-related messages, and having difficulty disconnecting from work during non-work hours (OECD, 2019^[59]).

45. Although not directly related to digital and innovative tools for corporate health, these aspects of the digitalisation of work, among others, can significantly impact workers' physical and mental health and should be considered as potential challenges underlying the introduction of these tools.

3. Case studies

46. This section presents four case studies - selected by member countries - showcasing the use of digital tools to promote health and well-being at the workplace. The selection of the case studies encompasses a diversity of tools, health topics and service providers. The four case studies include (1) wearable devices tracking and promoting physical and mental health, (2) a mobile app and a corporate health service addressing women's health issues, (3) a mobile app powered by artificial intelligence offering personalised health prevention counselling and (4) a points-based health insurance programme incentivising healthier lifestyles.

47. Each case study describes the tool or programme, examines the behaviours it targets and the behavioural principles it utilises, and summarises the evidence available regarding its effectiveness, cost, and management of health data, as well as the challenges and opportunities for its successful adoption.

3.1. Wearable devices to monitor and promote healthy lifestyles³.

48. Modern wearable devices are electronic gadgets capable of tracking, analysing and transmitting biometric data. These data often include steps, calories, sleep patterns and physical activity by type, duration and intensity. Wearable devices include smartwatches, fitness trackers, smart rings, and virtual/augmented reality headsets. Wearables are designed and marketed as tools to motivate users to increase physical activity and improve health by allowing them to monitor their health behaviour (Phillips et al., 2018^[60]; Patel, Asch and Volpp, 2015^[61]). This case study focuses on wrist-worn wearable devices (e.g., smart watches) and associated corporate health services.

3.1.1. Description

49. This case study focuses on a corporate health solution that uses wearable devices to gather biometric data. Data is then analysed to provide tailored health and productivity recommendations to employees and programme managers within the client company. The data collected by the wearables are accessible on a web platform, which also allows the management of some functions of the devices (e.g., frequency of data updates). Smartwatches can collect various biometric data, including heart rate, sleep quality, daily steps, stress levels and physical activity. Table 3.1 offers a non-exhaustive overview of the biometric indicators commonly collected by wearable devices.

Table 3.1. Wearable devices measure a wide variety of biometric indicators.

Indicators/Features	Description
Advanced sleep and sleep score	Measurements of sleep stages, length and quality.

³ This case study benefitted from the inputs collected during an interview and material circulated by Garmin Health

Blood oxygenation level during daytime and nighttime	Saturation levels provide information on adaptation to changes in altitude or indicate the presence of abnormal health conditions.
Body battery	Estimates bodily energy reserves from data on heart rate variations, stress, sleep quality and activity levels.
Heart rate	Unexpected changes in heart rates while inactive might indicate changes in health status.
Respiration	Relevant for athletic performance and indicative of cardiovascular fitness.
Aerobic fitness	The maximum volume of oxygen a body can consume per minute and kilogram of body weight at a body's maximum performance. This indicator is meant to increase as the level of fitness improves.
Cardiovascular status	A summary analysis of cardiovascular health including data on heart rate, pulse oxygen, respiration, stress level and heart rate variation
Menstrual cycle tracking	Period tracking with start and end dates of period, predictive cycle timeline, symptom tracking and support for notes.
Pregnancy tracking	Tracking of expected due date, progress of pregnancy and pregnancy timeline and support for logging several pregnancy health-related events and programming reminders.

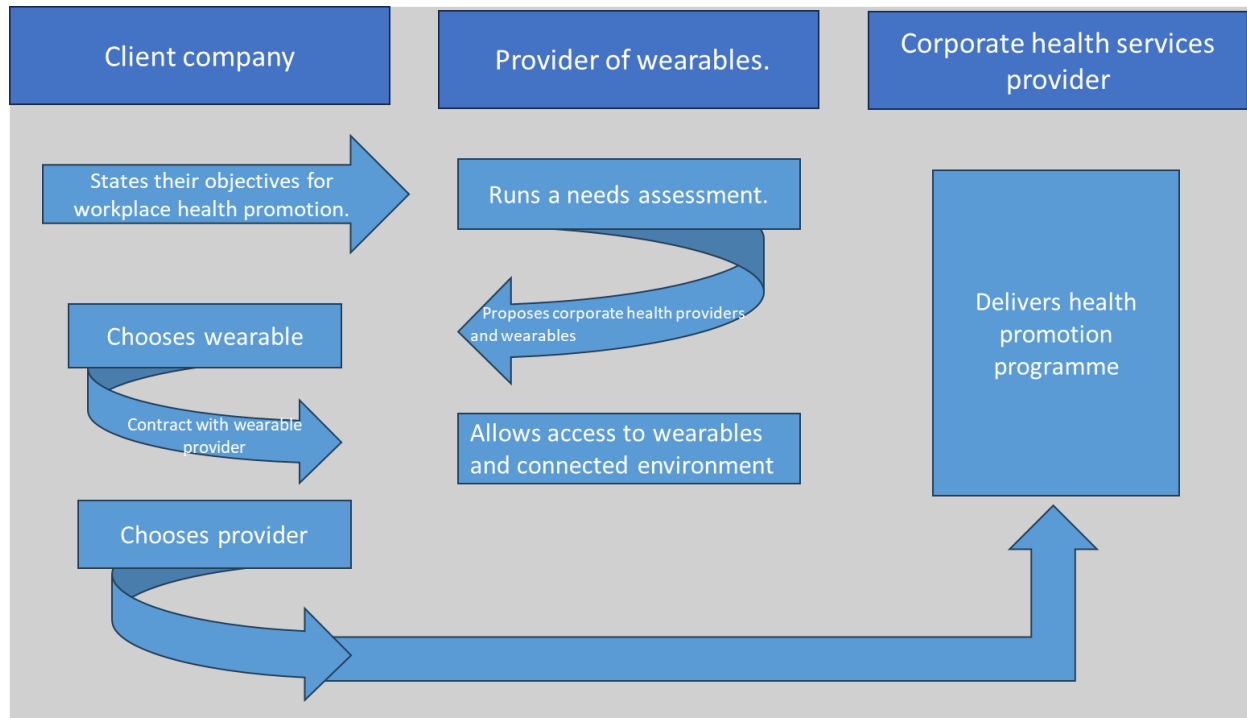
Note: different models and brands of wearables have different capabilities. The list presented in this table is only for illustrative purposes.

Source: Garmin, (2024^[62]), Health Science, <https://web.archive.org/web/20240222153929/https://www.garmin.com/en-US/garmin-technology/health-science/>

50. Wearable devices are usually paired with digital apps. When wearable devices are consistently worn, the apps report day-to-day data on the user's health and fitness. These data include steps taken and calories burned per day, sleep, sports performance (e.g., cycling) and weight variation in time. In addition, some apps support user engagement by awarding badges when specific landmarks are achieved, such as improving previous performance marks, engaging in an activity for the first time, or entering weight data into the app.

51. A possible business model for B2B corporate health services is based on partnerships between the providers of wearable devices and companies specialised in corporate health programmes (Figure 3.1). This process considers the client-company's health needs, health demands, and resources.

Figure 3.1. Wearable providers collaborate with third parties to offer corporate health services.



3.1.2. Target health behaviours and behaviour change tools

52. Wearable devices have demonstrated effectiveness in improving physical activity levels (Ferguson et al., 2022^[63]). In a systematic review and meta-analysis, wearables and similar devices were the most effective compared with other treatments and control interventions aimed at participants with overweight and chronic comorbidities (McDonough, Su and Gao, 2021^[64]). A review of a selection of five wearable devices analysed the features to promote behavioural change and an active lifestyle and identified the following seven key characteristics: goal setting, action planning, review of behaviour goals, discrepancy between current behaviour and goal, feedback on behaviour, self-monitoring of behaviour and biofeedback (Düking et al., 2020^[65]). Table 3.2 describes these behaviour-change tools and specific examples of their use for health promotion.

Table 3.2. Behaviour change tools commonly used on wearable devices.

Behaviour-change tools	Description	Examples
Goal setting	Set or agree on a goal defined in terms of the behavior to be achieved.	Set the goal of eating five pieces of fruit per day as specified in public health guidelines.
Action planning	Prompt detailed planning of performance of the behaviour (must include at least one of context, frequency, duration, and intensity). Context may be environmental (physical or social) or internal (physical, emotional, or cognitive) (includes 'Implementation Intentions')	Prompt planning the performance of a specific physical activity (e.g., running) at a particular time (e.g., before work) on certain days of the week.
Review of behaviour goals	Review behaviour goal(s) jointly with the person and consider modifying goal(s) or behaviour change strategy in light of achievement. This may lead to re-setting the same goal, a small change in that goal or setting a new goal instead of (or in addition to) the first, or no change.	Examine how well a person's performance corresponds to agreed goals (e.g., whether they consumed less than one unit of alcohol per day) and consider modifying future behavioural goals accordingly (e.g., by increasing or decreasing alcohol target or changing the type of alcohol consumed).

Discrepancy between current behaviour and goal	Draw attention to discrepancies between a person's current behaviour (in terms of the form, frequency, duration, or intensity of that behaviour) and the person's previously set outcome goals, behavioural goals or action plans (goes beyond self-monitoring of behaviour)	Point out that the recorded exercise fell short of the goal set.
Feedback on behaviour	Monitor and provide informative or evaluative feedback on performance of the behaviour (e.g. form, frequency, duration, intensity)	Inform the person of how many steps they walked each day (as recorded on a pedometer) or how many calories they ate each day (based on a food consumption questionnaire).
Self-monitoring of behaviour	Establish a method for the person to monitor and record their behaviour(s) as part of a behavior change strategy	Ask the person to record daily, in a diary, whether they have brushed their teeth for at least two minutes before going to bed.
Biofeedback	Provide feedback about the body (e.g. physiological, or biochemical state) using an external monitoring device as part of a behaviour change strategy	Inform the person of their blood pressure reading to improve adoption of health behaviours.

Source: Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W., Eccles, M. P., Cane, J., & Wood, C. E. (2013)^[66]. The behavior change technique taxonomy (v1) of 93 hierarchically clustered techniques: building an international consensus for the reporting of behavior change interventions. <https://doi.org/10.1007/s12160-013-9486-6>

Wearable devices that are easy to use and combined with interventions that give a sense of purpose are more likely to be effective.

53. **Wearable devices are more likely to be used if they are practical.** If users wear the device continuously, the data collected is likely to be of higher quality and, consequently, of more informative value. Features such as long-lasting battery and the waterproof capabilities of all devices aim at increasing the likelihood of users wearing the devices most of the time (El-Gayar and Elnoshokaty, 2023^[67]). Perceived usefulness and convenience are considered critical factors for expanding the market of wearable devices beyond people interested in fitness and competitive sports to include individuals seeking to improve their health status.

54. **Linking activities of corporate health programmes with socially relevant incentives, such as helping the environment, can improve adherence and participation.** For example, a heating and cooling company based in Germany incentivised involvement of its employees in a physical activity programme by committing to plant one tree for each three kilometres ran per participating employee. This incentive was introduced alongside a process to make the company more sustainable, shifting from fossil fuels to renewable energy as their primary power source. In this case, the value for users was in the social incentive arising from contributing to a valuable cause. This approach is what behavioural insights approaches call “ego” incentives as they improve self-perception (Garmin, 2021^[68]).

55. Including employees in the planning of corporate health programmes is an additional tool to increase engagement and participation. Corporate health programmes planned and implemented participatively are likely to increase employee buy-in and adherence. This finding aligns with research showing that higher engagement of employees and unions in corporate health and safety planning boosts workplace health results (Reilly, Paci and Holl, 1995^[27]; Trades Union Congress, 2016^[69])

3.1.3. Effectiveness

Wearable devices effectively improve health behaviours, making them attractive tools to support corporate health promotion programmes.

56. Wearable devices are effective at improving physical activity levels and other relevant health outcomes. A meta-analysis found that wearable activity trackers are effective at improving physical activity levels and weight for all age groups among healthy and clinical populations, equating to around 1800 additional daily steps, 40 additional minutes of daily walking and reductions of approximately 1 kg in body weight, with benefits lasting for at least six months (Ferguson et al., 2022^[63]). Other systematic reviews

and meta-analyses have found positive effects for increasing physical activity among hospitalised adults (Szeto et al., 2023^[70]), older adults (Wu et al., 2023^[71]), healthy (Wu et al., 2023^[71]) and overweight (Wang et al., 2022^[72]) children and adolescents, cancer survivors (Singh, Zopf and Howden, 2022^[73]) and patients with chronic diseases (Franssen et al., 2020^[74]).

57. Earlier research noted that in the long-term, wearable devices might not be more effective at physical activity and weight management than alternative methods- such as non-digital “pen and paper” programmes and literacy training on healthy lifestyles (Fawcett, van Velthoven and Meinert, 2020^[75]; Brickwood et al., 2019^[76]). This performance has been explained citing heterogeneous and rapidly evolving technology (Cajita et al., 2020^[77]) and intervention delivery aspects that might decrease the comparability among wearable devices and among studies.

58. Moreover, wearable devices are not meant to be a self-standing tool for health promotion (Patel, Asch and Volpp, 2015^[61]). The determinants of dietary behaviour encompass food availability, accessibility, and affordability, among other factors. Digital devices should not be expected to provide an all-encompassing solution. Instead, they should complement other interventions to encourage and support self-management of healthy behaviours (Riffenburg and Spartano, 2018^[78]).

Methodological heterogeneity and variability among device features are challenges in assessing their effectiveness as tools for health promotion.

59. Wearable devices have evolved over the last fifty years, from basic step counters to more modern smart watches capable of tracking speed, heart rate, sleep and blood oxygen levels, among others (Bassett et al., 2017^[79]). More recent models of wearable devices are used to support several types of health promotion programmes, with physical activity, weight management, mental health and well-being and sleep quality being primary areas of interest for corporate health (Huhn et al., 2022^[80]). Different models and brands of devices are substantially different regarding features such as user interface, comfort and size of the device, battery durability, and behavioural tools used. Since these features are likely to impact user adherence and the quality of data collected, the heterogeneity of the devices has an impact on their effectiveness (El-Gayar and Elnoshokaty, 2023^[67]; Kaewkannate and Kim, 2016^[81]; McDonough, Su and Gao, 2021^[64]).

60. More broadly, device-, user-, and data governance-related factors can pose challenges for using wearable devices. Device- and technical-related factors include hardware, software, and device connectivity. User-related factors include not wearing the device consistently and making mistakes when using it. Data governance-related factors include a lack of standardisation of the different parameters and indicators produced by wearable devices (Cho et al., 2021^[82]).

Reliability and validity of biometric data measured using wearable devices.

61. The reliability and validity of data collected through wearable devices is an essential pre-condition for their effectiveness. Research has analysed the accuracy of wearable devices for measuring biometric parameters and predicting health outcomes. A systematic review shows that wearable devices accurately measure steps and heart rate in laboratory settings, but with some variation by manufacturer and model. The rapidly evolving technology of wearable devices might swiftly increase their performance as measurement instruments, and further research is required to properly assess the reliability and validity of more recent models (Fuller et al., 2020^[83]).

3.1.4. Cost

62. Corporate health programmes costs using wearable devices encompass i) the wearable devices and their connected environment, and ; ii) costs of the health promotion and prevention intervention offered by a third party. Within the framework of B2B corporate health services, the client company usually covers

all or a fraction of the cost of the wearables. In some cases, employees can customise and upgrade the model they get at their cost. This customisation option seeks to increase adherence, assuming that users are more likely to wear the devices if they like them. The cost of the health promotion components may vary according to the provider. Most often, prices vary according to the number of employees of the client company.

3.1.5. Health data management and protection

63. Wearable devices collect and transmit sensitive personal data, including location, health information and even financial details, which may be vulnerable to unauthorised access, misuse, or breach. An instance of potential misuse is managers accessing employee health data and using it as grounds for discrimination based on health status. Good practices in cybersecurity, data privacy, and data management can reduce such risks. For example, the Application Programming Interface (API) for certain wearable devices is designed to comply with military-level standards for cybersecurity and privacy, minimising the risk of malicious cyber activity (Garmin, 2023^[84]). In addition, to ensure the anonymity of data, sharing data only at an aggregate level with a minimum sub-group size allows programme managers to compile statistics without inferring the health status of individual employees. Finally, attributing full ownership of data to the end-user could prevent any third party from using it for any purpose without the explicit and informed consent of the user.

3.1.6. Opportunities and challenges

64. Wearable devices are seen as powerful tools for corporate health programmes. They offer several advantages for accessing health information and services, reducing scaling costs, delivering personalised health guidance, and steering individuals towards healthier choices in real time (Koh et al., 2021^[85]). However, these devices, also pose at least three crucial challenges that demand careful consideration.

65. A first challenge is ensuring user engagement and adherence. Factors like digital literacy, health literacy and consistent use of these devices are critically relevant. For instance, older adults might initially struggle due to limited familiarity with digital tools but once these barriers are addressed, their adoption rate mirrors that of other age groups (Wilson et al., 2021^[86]; Paolillo et al., 2022^[87]; Kyytsönen et al., 2023^[88]). Moreover, individuals already inclined towards physical activity and healthy habits tend to be keener users of wearable devices within corporate health programmes. Research indicates that incorporating social incentives, such as fostering connections among users or sharing health accomplishments on social media, can bolster long-term usage of wearable devices (Friel, Cornelius and Diaz, 2021^[89]).

66. A second critical concern relates to health equity and accessibility. Ensuring equitable access to wearable devices remains fundamental to preventing further disparities in health. Some devices necessitate companion applications on mobile phones or computers, potentially limiting access to those lacking these resources. Furthermore, studies suggest that these devices may not yield significant benefits for individuals with lower socio-economic background, although the mechanism through which this happens is not yet precise (Western et al., 2021^[90]). These findings emphasise the need for tailored strategies to bridge the gap between socio-economic groups.

67. Last, privacy, cybersecurity, and the ethical use of data, especially in the field of digital health, remain significant challenges when it comes to wearable devices. Issues surrounding data privacy, potential secondary data usage beyond initial intentions and defining the boundaries of 'nudging' individuals towards healthier choices while respecting their freedom of choice require attention.

3.2. Mobile apps to promote and manage women's health⁴.

68. Tailored apps and programmes can improve women's health and tackle underlying causes of gender inequalities at the workplace. Issues such as perimenstrual symptoms, pregnancy and fertility issues, endometriosis and menopause, among others, translate into obstacles for women to be healthy, productive and progress in their careers and imply economic losses for companies. This case study focuses on mobile apps and corporate health programmes introducing educational interventions, health services and other measures to prevent and address women's health issues at the workplace.

3.2.1. Description

69. Corporate health services for women's health vary in their scope. They can support women in different ways, including accessing care through teleconsultation with specialised physicians, facilitating treatment by proposing delivery services to fill prescriptions and increasing awareness around women's health through education.

70. Table 3.3. **Femtech companies focus on different aspects of women's health.** presents examples of existing platforms for a diversity of women's health issues.

Table 3.3. Femtech companies focus on different aspects of women's health.

Platform	Area	Description	Base country
BenEssere Mamma	General women's health	Provides women with a convenient way to access a self-help protocol to manage stress and anxiety during pregnancy.	Italy
Luna Luna	Menstruation, Pregnancy, Menopause.	Provides a suite of services to track menstrual cycles, access gynecological care and improve literacy around women's health.	Japan
Maven	General women's health	Services include a virtual clinic offering services for women's and family health, including fertility, pregnancy, postpartum, parenting care and return to work support. Services are offered in more than 30 languages and 175 countries and have served more 10 million families by 2021.	United States
Vira Health	Menopause	Their core product Stella combines artificial intelligence and evidence-based treatments with diet and lifestyle modifications to create an individualised 12-week plan for each user.	United Kingdom
MenoLabs	Menopause	The app offers support for symptoms and triggers, such as anxiety, hot flashes and night sweats. In a study with 15,000 users, 85% of participants reported a reduction in daily hot flashes (85%), headaches (65%) and mood swings (70%).	United States
WILD.IA	Fitness	Supports women's training needs, from nutrition to training to recovery, considering menstrual cycles, birth control, perimenopause, or post menopause.	Portugal
Twentyeight Health	Access to healthcare	Enables access to healthcare for women who are on government-funded insurance for low-income groups, or underinsured, in the United States.	United States

Source: Wiederhold, B. K. (2021). Femtech: Digital Help for Women's Health Care Across the Life Span. *Cyberpsychology, Behavior and Social Networking*, 24(11), 697–698. <https://doi.org/10.1089/cyber.2021.29230.editorial>

71. The following section details a possible structure of corporate health programmes for women's health encompassing health needs assessment, delivery and evaluation of the interventions.

⁴ This case study benefitted from the inputs collected during an interview and material circulated by the developers of the mobile phone application Luna Luna.

Diagnosing workplace needs around women's health.

72. A diagnostic survey can be the first step in introducing an app-based intervention to promote and manage women's health. The surveys evaluate the needs and resources available for a women's health programme within the targeted organisation. The surveys can also explore the prevalent attitudes of management and staff about women's health issues, such as maternity and menstruation. More broadly, diagnostic surveys can also investigate the perception and values of employees about diversity and inclusion, the configuration of the occupational health system in place, psychological safety and harassment policies and current literacy levels on women's health issues. A clear understanding of the resources, needs, and objectives of the company embarking on such an initiative is fundamental to defining the other components of the programme.

Interventions on menstruation, pregnancy, fertility, menopause and other women's health issues

73. Several interventions can be implemented once the needs around women's health in the workplace have been assessed. Interventions can deliver education or improve access to health services. For example, they can take the form of seminars focusing on menstruation, pregnancy, menopause, fertility, and endometriosis, among others. Services can include teleconsultation, delivery services to fill prescriptions and physical activity programmes tailored to women. The educational components open to both male and female employees seek to maximise the awareness of all employees about women's health. As for improving access to care, some corporate health programmes centred around women offer gynaecological teleconsultation services with medical specialists and online prescriptions to treat symptoms associated with, for example, premenstrual syndrome and menopause. This service is likely to decrease the personal burden of accessing care. Employers and insurance can fully or partially cover the cost of consultation and prescriptions.

Impact assessment

74. Women's health programmes can benefit from systematic evaluations of their impacts. These evaluations would demonstrate the value created by corporate health programmes centred around women's needs. Evaluation surveys can focus on core areas comprising health needs addressed, productivity impacts and knowledge about women's health. Moreover, current evidence suggests that the costs of women's health issues are significant at the company and societal levels, thus addressing them could translate in positive economic impacts. (Box 3.1).

Box 3.1. Women's health issues have meaningful costs and the market for femtech products that address them is on the rise.

75. Women's health issues, such as perimenstrual symptoms, menopause, gynaecological cancer, or infertility treatment, lead to increased healthcare costs and productivity losses. According to Japan's Ministry of Economy, Trade and Industry, the associated socio-economic losses are valued at JPY 3.4 trillion [USD 21.67 billion] yearly. It includes losses related to absenteeism, poor performance, staff turnover (including new recruitment), and retirement.

76. A survey of more than 2000 women in the United Kingdom by the Chartered Institute of Personnel and Development (CIPD) found that 69% of women had a negative experience at work because of their menstruation symptoms, about 50% stated they had had to miss work because of their period symptoms, -with one in five taking sick leave- and around 60% women stated that they had

worked when they did not feel well enough (CIPD, 2023^[91]). Another survey by a United Kingdom-based insurance company found that 12% of women undergoing fertility treatment quit their jobs due to a lack of support from their employers (Zurich, 2022^[92]).

3.2.2. Effectiveness

77. Currently, there is little peer-reviewed evidence on the effectiveness of corporate women's health programmes. Data from evaluations performed by a company delivering a comprehensive corporate women's health programme signal that their intervention has yielded positive results regarding user satisfaction, improvement of menstrual symptoms and productivity. Six months after implementation, on average, 92% of employees were satisfied with the programme (LIFEM, 2023^[93]). In terms of productivity impacts, before the introduction of the programme, self-evaluated performance during menstruation was rated at 54.6 points out of 100, using non-menstrual performance as the performance level of reference. Six months after introducing the programme, the self-evaluation score rose to 76.4 points. In addition, the same analysis found that the number of days that the physical and mental discomforts associated with menstruation affected work or daily life decreased from 3.9 days to 1.9 days per month. The number of days partially missed from work in the previous six months due to menstruation also improved, from 0.2 days to 0 days (MTI, 2023^[94]).

3.2.3. Cost

78. The cost of corporate women's health programmes can vary substantially depending on the number of employees covered and the complexity of the programme. Providers often determine their pricing based on the number of employees and their specific services. In some cases, participation in the programme may also involve costs for individuals, such as following teleconsultations or prescriptions received through the programme. Employers may fully or partially cover these costs under some schemes.

3.2.4. Health Data management and protection

79. Research on technological solutions to address women's health needs - usually branded as "Femtech" - has highlighted several privacy and security issues associated with the gathering and utilising of personal and health data. These issues include the risk of unauthorized access, distribution, or misuse of the data, which underscore the importance of robust data privacy protection measures (Alfawzan and Christen, 2023^[95]). Some Femtech companies try to minimise threats to privacy by allowing only a limited number of persons from the client company to access data and ensuring that information entered in apps by users is not disclosed to superiors or colleagues (LIFEM, 2023^[93]). Other providers of corporate health programmes avoid this risk by allowing employers to access data only at the aggregated level.

3.2.5. Challenges

80. There are several challenges possibly arising from the introduction of corporate women's health programmes. First, women might not feel comfortable making use of the services provided by their employers, because of the fear of privacy breaches disclosing information about pregnancy and sexual life and the risk of discrimination (Alfawzan et al., 2022^[96]; Alfawzan and Christen, 2023^[97]). Second, management and male co-workers may have reserve or disagree with programmes that exclusively target women. Programme managers can address this concern by raising awareness about, and recognising the impact of, women's health issues on productivity. Third, the low level of digital literacy might hamper user engagement with digital platforms, which might require additional training in digital skills to be overcome.

3.3. AI-powered mobile application for managing physical activity, sleep, diet and mood⁵.

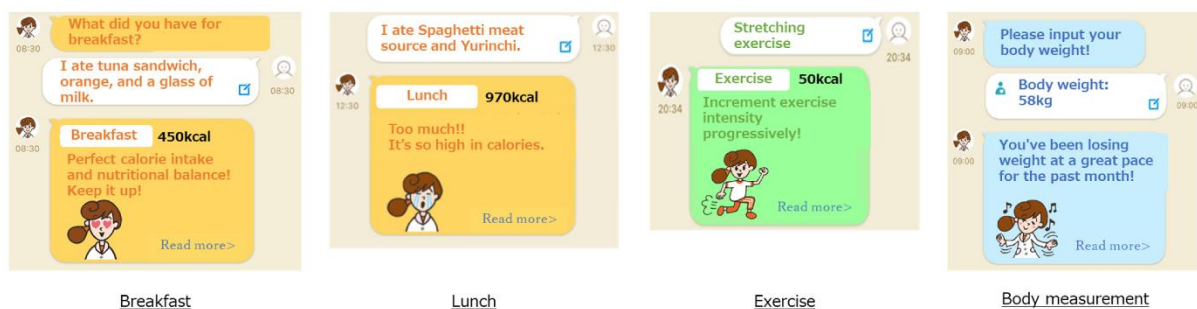
81. Artificial Intelligence (AI) in health promotion quickly evolves and expands. AI-based apps hold immense potential for health promotion and well-being. They can provide personalised health recommendations, monitor vital signs, and predict potential health risks based on data analysis. These apps can also facilitate remote healthcare, making it more accessible and efficient. Furthermore, AI can assist in providing mental health support through therapeutic interactions. This case study focuses on mobile phone applications promoting healthier lifestyles across several dimensions by providing personalised advice based on user data.

3.3.1. Description

82. AI-based mobile smartphone applications can assist users in managing their diet, exercise, mood and sleep quality. These applications offer users a simple and unified way of managing their lifestyle while providing them with personalised health and fitness advice based on the data fed into the application. Users input information about their daily diet, exercise, mood and sleep to receive AI-generated advice for meals and exercise based on predefined goals like weight loss or muscle building. To support diet tracking, apps may feature image recognition in which the nutritional value of food is estimated using pictures. Apps can also produce AI-guided health recommendations based on the record of activities and food consumption. Additionally, users can upload medical checkup results into the app to predict future health risks like diabetes or high blood pressure and receive personalised recommendations to encourage healthier habits based on these predictions. Users can access the applications via individual or company subscriptions.

83. Figure 3.2 exemplifies the user interface of an AI-based app and the feedback provided following the input of information on dietary intake, physical exercise and weight.

Figure 3.2. Example of the feedback provided by an AI-based app following the input of data on dietary intake, physical exercise and weight.



Source: Nakata, Y.; Sasai, H.; Goshō, M.; Kobayashi, H.; Shi, Y.; Ohigashi, T.; Mizuno, S.; Murayama, C.; Kobayashi, S.; Sasaki, Y. A Smartphone Healthcare Application, CALO mama Plus, to Promote Weight Loss: A Randomized Controlled Trial. *Nutrients* 2022, 14, 4608. <https://doi.org/10.3390/nu14214608>

⁵ This case study benefitted from the inputs collected during an interview and material circulated by the developers of the mobile phone application Calo mama Plus.

3.3.2. Target health behaviours and behaviour-change tools.

84. Companies can utilise the data generated by these apps to tailor their occupational health programmes for specific employee groups. Data allow the measurement of health indicators by age group, gender, and department within the company. Based on these insights, companies can implement interventions such as exercise sessions or improvements in the work environment. Moreover, these apps can support the delivery of workplace fitness challenges. For example, companies can organise competitions to encourage physical activity and the adoption of healthier diets. Users join small teams during short competitions and can track individual and team standings to create social incentives for healthier habits. The apps can support the initiative by awarding points for performing programme-related activities. Moreover, a collaboration between the company and various supermarkets and healthcare providers can be set up to offer users additional incentives, such as discounts in a variety of products and services, among other benefits.

3.3.3. Effectiveness

85. Currently, there is little peer-reviewed evidence on the effectiveness of AI-based apps for health promotion. A randomised controlled trial (n = 141) testing the impact of an AI-based health app suggests that the app would be effective in promoting weight loss over three months. During the trial, a group of 141 participants was randomly assigned to the intervention (n = 72), and another group was established as control (n = 69). An analysis adjusted for confounders showed a greater reduction in body weight (-1.60 kg; 95% confidence interval -2.83 to -0.38) in the group that received the intervention compared to the control group (Nakata et al., 2022^[98]).

3.3.4. Cost

86. The use of similar apps is usually based on the payment of a monthly subscription that may vary on specific parameters, including, for example, the number of employees. For the case used as the basis for this analysis, companies could expect to pay a monthly fee of about USD 2 per user.

3.3.5. Health data management and protection

87. The apps can gather various health data such as daily diet, exercise, mood, sleep quality and medical checkup results. Usually, users must agree to share their data with the company that developed the app. Some corporate health programmes might require users to share data with their employers upon starting app usage. Additionally, if the apps collaborate with external partners, such as supermarkets or healthcare providers, users often must also agree to share personal data with these entities. AI-based apps should operate based on explicit and informed consent from the users regarding data access and management.

3.3.6. Opportunities and challenges

88. The use of AI-powered apps offers promising opportunities for corporate health. AI-driven solutions promise to reduce the costs associated with workplace health promotion and prevention by automating data collection, analysis, and interpretation. Additionally, the personalised care facilitated by AI can enhance employee engagement and minimise unnecessary expenditures by tailoring interventions to individual needs. Integrating AI in corporate health programmes can streamline operations, optimise resource allocation, and deliver more targeted and cost-effective health promotion strategies.

89. However, challenges exist. Some employees may not show interest in using or continuing to use such apps. Additionally, companies facing limitations in human resources might struggle to manage the

app effectively and design more comprehensive wellness programmes. Overcoming these challenges is crucial to fully harnessing the benefits of AI-driven wellness solutions in corporate settings.

3.4. Behavioural engagement platforms in insurance to promote healthier lifestyles among health insurance policyholders.

90. Behavioural engagement platforms incentivise users to engage in healthier behaviours. These programmes feature points-based reward schemes that award points for engaging in activities related to health literacy, diet, exercise, and health screenings, among others. Their goal is to lead to a healthier and more productive workforce, incurring in less and lower health expenditure. Users trade their points for benefits or discounts on goods and services offered by the programme and other business partners part of the programme's network. Benefits and discounts include activity tracking devices, fitness club memberships, fitness equipment, health services, spa services, and hotel stays. This case study focuses on behavioural engagement platforms that promote health and well-being and are linked to insurance offered by employers.

3.4.1. Description

91. Behavioural engagement platforms are based on the principles of token economies. In token economies, users collect points for engaging in predefined activities and can trade those points for benefits or goods facilitated by programme managers. In the case of behavioural engagement platforms in insurance, they seek multiple goals, including improving the health and well-being of users, improving the actuarial dynamics of the insurance companies, reducing healthcare expenditure, and improving workforce productivity. Box 3.2 presents an example of a behavioural engagement platform in insurance implemented in a company based in the United States.

Box 3.2. The case of McCarthy Holdings, Inc. and the Vitality Programme.

92. McCarthy Holdings, Inc. is an employee-owned construction firm operating in multiple states of the United States. Its workforce is 7,500, composed of field and office employees. As of November 2023, it had implemented the Vitality programme for its employees for a decade. The programme is a behaviour-based, insurance scheme that rewards employees for engaging in health promotion activities throughout the year.

93. Implementing the programme in this company has yielded substantial benefits for the workforce. A summary of such benefits is presented below:

- **Engagement and participation:** the participation rate in the Vitality health check – a comprehensive health screening included in the Vitality Programme - ranges between 49% and 59% of employees. Over the past decade, the company has maintained an average health assessment participation rate exceeding 75%. In the most recent year of the programme, there was a 5% rise in the completion of biometric assessments.
- **Effects on work Absenteeism, employee health and well-being:** employees who are highly engaged in the programme have reported 52% fewer health-related absences and a 14% improved perception of health compared to those less engaged.
- **Effects on employee retention:** the programme has positively influenced employee retention, with a 9% reduction in turnover rates among highly engaged employees.

94. Other factors have contributed to the programme's high level of employee engagement. These include leadership support, a culture promoting health and wellness, the company's employee-owned status and a robust programme of employee-led advocacy efforts for workplace health.

Source: Vitality (2023^[99]), McCarthy case study, <https://web.archive.org/web/20240124124801/https://www.vitalitygroup.com/wp-content/uploads/2023/11/McCarthy-case-study-2023.pdf>

95. Behavioural engagement platforms are usually built around components encompassing health checkups and lifestyle assessments, personalised health management plans, programme points and rewards. Health checkups and lifestyle assessments can consider physical activity, dietary habits, tobacco and alcohol use, mental health and biometric markers like height, weight, blood pressure, fasting glucose and cholesterol. Programme managers can use this information to set up personalised health plans consisting of selected activities that contribute to health and well-being, such as weekly physical activity or reading health and wellness articles. Progress through health management plans can be assessed using data collected from wearable devices. A key component of behavioural engagement platforms in insurance is rewarding users. Users earn programme points when participating in agreed activities or achieving specific outcomes (e.g., losing a given amount of weight). These points can be exchanged for discounts and gift cards of different kinds. Usual rewards include discounts for gym subscriptions, fitness equipment, wearable devices, or leisure activities. In some programmes, users may acquire a status level depending on their overall performance, with higher status levels offering increasingly attractive rewards and advantages.

3.4.2. Target health behaviours and behaviour change tools

96. At the individual level, behavioural engagement platforms target a variety of behaviours related to dietary habits, physical activity and health literacy. Table 3.4 presents a non-exhaustive list of techniques

based on behavioural insights used in behavioural engagement platforms. It includes programme points, programme status, simplifying access to healthy foods, leveraging social support, activity trackers, and challenges. Other fundamental behavioural insights are also broadly used in behavioural engagement platforms. One of these additional approaches is reward substitution, which consists of introducing an immediate reward - such as money - for an effortful behaviour, such as physical exercise.

Table 3.4. The programme uses behavioural science-based tools to change health habits.

Behavioural insight's-based technique	Description of the technique
Programme points	Programme points follow the principles of token economies. Users are awarded points through activities such as completing a health risk assessment, verified workouts, biometric screenings, corporate challenges, healthy eating and health education courses. Points are then converted into digital currency that can be redeemed for gift cards and fitness devices.
Programme status	Programme status -from Bronze, Silver, and Gold to Platinum- allows users to gain awareness of their progress and to stay motivated and engaged with the programme in the long-run. Users progress in status by accumulating programme points and advancing in status comes with specific rewards.
Simplifying access to healthy food	Programme offers access to discounts when buying a selection of healthy food products in partner grocery stores. Discounts on healthy food items attempt to increase their attractiveness when compared to less healthy alternatives.
Social support for healthier behaviours	Some employees can act as champions and assume an active role in advocating for a culture of wellness and health. This programme component leverages social incentives and introduces organic presence of programmes in the workplace.
Subsidised activity trackers	Wearable devices are relevant tools for delivering programmes since they allow tracking and verifying users' engagement and, depending on their specific characteristics, they can have additional features for self-management of relevant health behaviour.
Challenges	Challenges are events that leverage on specific holidays or themes to motivate people to engage in health-promoting activities. An example of a challenge can be an activity in which employees constitute teams and compete against each other to earn extra points or special rewards. Weight loss and smoking cessation can be examples of themes for challenges.

Source: Vitality Group, (2017_[100]), McKesson Case Study: C. Source: Vitality Group, (2017_[100]), McKesson Case Study: C. Everett Koop Award Winner 2015

3.4.3. Effectiveness

97. Currently, there is little peer-reviewed evidence on the effectiveness of behavioural engagement platforms in insurance, with most of the available data stemming from assessments performed by platforms' owners. Table 3.5 presents measurements of the effectiveness of platforms on the dimensions of user engagement and experience, labour market outcomes, health outcomes, and health expenditure.

Table 3.5. Effectiveness of a programme for behavioural engagement in insurance across user experience, labour, health and health expenditure outcomes.

User engagement and experience	Labour-related outcomes	Health outcomes	Health expenditure
53% of users earn points monthly, and 82% complete at least an activity per year (Group, 2022 _[101]).	35% lower aggregate turnover rate for more engaged Vitality members, than less engaged ones (Vitality Group, 2023 _[102]).	Active members reduce their risk of hospitalization by 29% compared to less active members (Vitality Group, 2023 _[103]).	USD 4.7 million are saved in medical costs in three years for a workforce of 37 000 employees (Vitality Group, 2017 _[100]).
Increase of 92% in engaged adult participant levels after three years, compared to baseline participation levels (Vitality Group, 2017 _[100]).	A 4% reduction in Medical and prescription claims (Vitality Group, 2023 _[102]).	About 47% of Vitality users quit smoking (Vitality Group, 2023 _[103]).	A 40% reduction in hospital admission costs (OECD, 2024 _[104]).
About 39% of members in 2014 reached Gold or platinum Vitality Status compared to 12% in 2012 (Vitality Group, 2017 _[100]).	A 3.65 percentage points increase in job performance, from 81.69% to 85.34% after three years of participation in the programme (Vitality Group, 2017 _[100]).	Risk reduction of 9% for lifestyle and biometric-driven risks (Vitality Group, 2017 _[100]).	A 14% reduction in costs per patient (OECD, 2024 _[104]).
About 31% of users registered for the Vitality Healthy Food Programme in the 2014 programme cycle (Vitality Group, 2017 _[100]).		About 87% of Vitality members reach recommended weekly exercise guidelines compared to 61% of the general population (Vitality Group, 2023 _[103]).	A 25% reduction in hospital stays (OECD, 2024 _[104]).
		The average daily steps of Vitality users increased by 17% (OECD, 2024 _[104]).	

Note: McKesson is a large healthcare services company with over 37 000 employees in the United States and with about USD 137 billion in annual revenue.

3.4.4. Cost

98. The cost for employers of behavioural engagement platforms usually varies according to the number of employees covered, their age ranges and the specific features of the platform. Using a cost estimation tool available online for the United Kingdom, a platform covering 50 employees aged between 18 and 29 would have a cost of GBP 15.07 [USD 19.09] per employee per month as of February 2023 (Vitality Group, n.d._[105]), equivalent to an annual cost of USD 248.17 per employee. The same platform estimates that a company of 50 employees who earn an average yearly wage of GBP 35 000 [USD 43 157] and who are highly engaged in platform activities would see productivity gains of up to GBP 17 000 [USD 19 852] per year (Vitality Group, 2023_[106]). However, no peer-reviewed sources back these claims. Moreover, the cost-effectiveness of health checkups tailored to all employees, such as the ones proposed by these platforms, is part of an on-going academic debate (Box 3.3).

Box 3.3. The cost-effectiveness of health checkups is an open debate.

99. Current evidence around the cost-effectiveness of health checkups at the workplace is scarce. The value of health checkups and screenings stems from prevention and early detection of disease, which would reduce related treatment costs and improve prognosis. However, ascertaining the value of health checkups requires reference pathways illustrating what would have changed for the patient if the health checkup had not occurred. Additionally, these pathways change depending on the outcomes targeted, implying that health checkups might be more beneficial for some conditions and risk factors and less useful for others, making it necessary to consider their cost-effectiveness individually.

100. This considered, research suggests (Iragorri and Spackman, 2018^[107]) some challenges and opportunities to fully grasp the cost-effectiveness of health checkups:

- **Screening pathways should be modelled including patient treatment:** research should consider data regarding the actions taken after a positive screening. Knowing whether patients received treatment and how it impacted their health status is necessary to assert the value of health checkups.
- **The costs of false positives and false negatives should be accounted for in the cost-effectiveness calculations.** The accuracy of diagnostic instruments varies, and wrongful diagnoses and missed diagnoses come at a cost, either in terms of unnecessary treatment or worsened health outcomes. Some cost-effectiveness analyses assume 100% accuracy of diagnostic instruments in their methods, but this might lead to an overestimation of disease and downplay health harms due to unnecessary treatment.

101. Implementing health checks covering multiple health outcomes should be done considering the potential risks and benefits of each component. The United States Preventive Services Task Force (USPSTF, n.d.^[108]) issues guidelines and recommendations about individual screening tools, indicating where and how they would bring the most value. These guidelines also recommend screening and health checks targeting groups at higher risk for particular outcomes. For example, this includes mammograms tailored to women with a family history of breast cancer, rather than for the general female population.

3.4.5. Health data management and protection

102. Behavioural engagement platforms manage sensitive amounts of personal data. These data are collected through websites, wearable devices and mobile applications. The important amount of data required to deliver these programmes strengthens the need to introduce data management policies that comply with international standards and guarantee users' rights concerning ownership of personal information, explicit consent for using data, the ability of users to revoke consent and the duration of data retention.

3.4.6. Opportunities and challenges

103. Behavioural engagement platforms have the potential to improve user engagement and adherence and lead to high motivation among users. Rewards of different kinds (e.g., discounts and gift cards) incentivise users to adopt and maintain healthier lifestyles. (Xiao, Wu and Hamari, 2021^[109]; Looyestyn et al., 2017^[110]; Mitchell et al., 2017^[111]) A review examining the effectiveness of financial rewards for promoting physical activity among adults found that modest financial incentives (USD 1.40 per day) increase physical activity for short and long interventions and after incentives were removed (Mitchell et al., 2019^[112]).

104. However, there are at least two challenges for behaviour engagement platforms in insurance. First, as mentioned in Section 3.4.5, concerns about data security and privacy arise due to constant monitoring of behaviours, raising questions about data usage and storage (Madanian et al., 2023^[46]; Brassart Olsen, 2020^[45]) and risk of exclusion of individuals with unhealthy lifestyles. The potential misuse of health data by third parties, such as insurance companies, is a potential risk from the patient's perspective (Madanian et al., 2023^[46]).

105. Second, programmes like the ones analysed in this case study might widen inequalities because of potential risk selection. Healthier individuals are likelier to join and engage actively in the programme than less healthy individuals, leading them to enjoy additional benefits while underserving the most disadvantaged groups. Socio-economic background can add another layer to health inequalities. People with higher education levels tend to engage more in health promotion activities than peers with lower education levels. A study assessing the representativeness of older adults recruited in a physical activity promotion programme found that eligible enrolled individuals had higher education and income than those who did not enrol (Martinson et al., 2010^[113]). Differences in participation by socio-economic status may entrench social inequalities in health, which are well documented (OECD, 2019^[114]).

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