

Leveraging Digital Tools for Women's Skills Development and Economic Empowerment

Evidence from low- and middle-income countries

Abstract

Enabling women's participation in the labor market is important for their empowerment and financial independence, as well as for broader economic growth. However, women's employment and growth remain constrained by a range of structural, informational, and social barriers. Digital technologies that enable virtual delivery of skills training, access to job platforms and online markets, and virtual networking may allow women to overcome barriers and increase their labor market participation. This evidence review synthesizes rigorous evidence on how digital technologies can be leveraged to deliver and enhance skills development for women's economic empowerment. The evidence is organized into five categories that both reflect the main digital tools and approaches tested in the randomized evaluation (RCT) literature related to skills development and the specific barriers women face: business skills constraints, limited networks, digital skills shortage, job-search frictions, and mobility/time constraints. By grouping studies this way, the review aims to clarify the distinct mechanisms—engagement, social capital, skill acquisition, job-search frictions, and mobility/gender-norm constraints—through which digital tools affect women's economic outcomes.

While the review highlights several interventions that show promise in supporting women's employment, more evidence is needed to understand which and for whom digital interventions are most effective.

KEY TAKEAWAYS

- Digital delivery of business training can positively impact business knowledge and practices but has had limited impact on women's business profits. The type of content and an engaging delivery format are crucial for sustaining user engagement and ensuring program completion.
- Emerging evidence suggests that digital tools—such as mobile apps and online platforms—can effectively expand access to networking and mentorship opportunities, positively affecting women's labor market engagement.
- Digital skills training—including online entrepreneurial skills, online marketing, and freelancing—can open entrepreneurial and employment pathways for women, but their success hinges on context and program design.
- Evidence indicates that access to online job platforms is more effective when paired with additional support, such as training on how to use the platform, improving online profiles, and strengthening job applications.
- Flexible work arrangements that allow women to work from home—such as online gig work—may allow women to participate in the labor market in contexts with restrictive gender norms.



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Introduction

In many low- and middle-income countries (LMIC), **women's participation in the labor market remains significantly lower than men's**, driven by a range of economic, social, and structural barriers (Heath, 2024; UN Women, 2024). Limited access to education and job training, restrictive gender norms, and caregiving responsibilities often constrain women's ability to enter and thrive in the workforce (Beegle & Rubiano-Matulevich, 2020; Jayachandran, 2021; Ubfal, 2024). Expanding economic opportunities for women is key—not only for their empowerment and financial independence but also for broader economic growth and poverty reduction (Heath, 2024; Siegrist, 2022).

Skills development is critical to successful labor market outcomes, yet traditional in-person and vocational training has limited impacts on women's employment and entrepreneurial outcomes, likely due to restrictive gender norms that prevent women from acquiring the necessary skills (Jayachandran, 2021; Siegrist, 2022; Ubfal, 2024). An evidence summary of in-person training for women is available in the Appendix.

Incorporating content and implementation strategies that address the specific constraints women face may be more successful at improving labor outcomes. Digital technology—internet, mobile phones and apps, online marketplaces and platforms—and related skills are a promising opportunity for reaching women and enabling their integration into the labor market by expanding access to skills training, job opportunities, and essential tools. It can also help overcome common barriers—such as mobility constraints, time limitations, and restrictive social norms—that often limit women's participation in the labor market.

To guide this review, a simple theory of change is adopted that links digital tools for skills development to women's labor market outcomes through a set of key mechanisms. As shown in the figure below, digital interventions can affect women's economic activity by building skills, expanding networks and mentorship, reducing job-search frictions, and easing time and mobility constraints shaped by gender norms. This framework informs how the evidence is organized and interpreted throughout the review.

DIGITAL INTERVENTIONS

- Digital Training Delivery
- Virtual Networking & Mentorship
- Digital Skill Courses
- Online Job Platforms
- Remote Work Opportunities

INTERMEDIATE OUTPUTS

- Knowledge, Skills & Credentials
- Business Practices
- Network & Social Capital
- Job Search Capacity
- Agency & Confidence

LABOR MARKET OUTCOMES

- Employment Participation
- Earnings & Profits
- Business Performance
- Work Quality

KEY MECHANISMS

- Strengthened ability to navigate and negotiate prevailing social norms.
- Expanded access to business and employment networks.
- Increased time flexibility and mobility for economic activities.
- Lower search costs and improved matching between workers, firms and opportunities.

ENABLERS AND SUCCESS FACTORS

- Engaging Design
- Complementary Support
- Digital Tools Access and Adoption
- Commitment Devices
- Market Linkages

Methodology & Scope

This search focused on randomized evaluations (RCTs) evaluating digital tools and skills interventions aimed at promoting women's economic empowerment. Eligible interventions included the digital delivery of business training, coaching or mentoring, digital skills development, online job search or matching platforms, and access to digital jobs. Studies were included if women made up the majority of the sample or if results were disaggregated by gender, even when women comprised less than 50 percent of participants. A total of 22 RCTs were identified that contribute to this evidence review. For details of the included studies see Appendix 2.

Key Lessons from Existing Research: Digital Approaches for Women's Skills Development and Economic Activity

1. DIGITAL DELIVERY OF BUSINESS TRAINING

Digital delivery of traditional business training—through mobile apps, video conferencing, or SMS—can have positive impacts on business knowledge and practices, but has had limited impacts on women's business profits.

The type of content and an engaging delivery format are crucial for sustaining user engagement and ensuring program completion. Enhancing digital training with reminder messages and light-touch personalised consulting have shown promise in increasing user engagement in some contexts, but more evidence is needed to assess how other commitment features—such as gamification, prizes, or networking—may impact completion.

- A smartphone app-based training program, combined with one-on-one video consulting, led to significant improvements in business outcomes for predominantly female franchise owners in Guatemala (Estefan et al., 2023). Participants saw increases in business knowledge (5.2 percent), sales (6 percent), and profits (USD 102, or 23.3 percent). The training also boosted the adoption of key practices, including marketing (11 percent) and finance and inventory management (6.4 percent). The intervention focused on formal business administration concepts as well as simple heuristics and rules-of-thumb, delivered through 28 short videos (1–7 minutes each) that participants could watch at their convenience (Roughly 91 percent of participants owned their own smartphone; tablets were loaned to participants without one). In addition, three personalized 30-minute video consultations with professional business advisors provided tailored guidance and strategies to improve business performance. Researchers found that one-on-one consulting significantly increased engagement with the app, raising the likelihood of a participant watching a training video by 4.5 percentage points.

To encourage course completion, the program included weekly WhatsApp reminders when new video capsules were released, mandatory knowledge checks between modules, and in-kind incentives—digital vouchers redeemable for chicken and pork inventory—awarded for each module completed. While the in-kind rewards had no additional effect on sales, text reminders were modestly effective: receiving a reminder was associated with a 0.8 percentage point increase in the likelihood of watching a video capsule on the same day. The

program demonstrated cost-effectiveness, with a ratio of 2.3 dollars in profit for each dollar spent on training.

- A financial heuristics training provided over the phone in India and the Philippines significantly improved business practices, though the study was underpowered to detect impacts on sales and profits (Cole, 2022). In the Philippines, the training increased adoption of recommended practices by 0.12 standard deviations (SD), and in India, the training led to an increase of 0.06 SD. After a 30-minute in-person orientation session that introduced the training program, microentrepreneurs received a call¹ at their chosen time per week, which then played a 3–4 minute message covering cash separation, customer credit, inventory management, and supplier management. The training was designed in a soap opera-style format with the main character (virtual narrator) depicted as a successful small business owner with years of experience who offered the microentrepreneurs practical tips on business management that she had learned over the years from running her own business.

Participants were engaged in both countries, with listenership rates of 60 percent in the Philippines and 48 percent in India. Additionally, 78 percent (Philippines) and 62 percent (India) of participants reported they would recommend the training program to their friends, family, and similar business owners. The training program seems to have a better impact on the business practices of participants with lower education and older businesses in both India and the Philippines. In the Philippines, rural participants and owners of sari-sari businesses (small grocery stores) experienced better impacts, while in India, non-food businesses had better impacts. The per-participant cost of training delivery was between USD 2.04 – 2.38 in India—depending on the language—and USD 14.99 in the Philippines, where airtime charges are much higher.

- Female entrepreneurs in Ethiopia with basic business skills were targeted for a smartphone app-based training featuring slightly more advanced content (derived from mobile MBA preparatory courses) compared to traditional training courses (Cassidy et al., 2024). Participants had smartphones and internet access, and received in-person support to download the app. These in-person information

¹Most participants owned a mobile phone and the rest had access to one through a family member.

sessions were critical for initial take-up, teaching women to download, log in, and use the app. An ad-hoc intervention showed that without this support, take-up was nearly zero—though these sessions also increased marginal delivery costs. While there was a two percentage point increase in business knowledge, there were no impacts on business practices, sales, or profits. The same training was offered in-person and had no impact on business practices, sales, or profits, which suggests the more advanced business training content may have been ineffective for female entrepreneurs.

Initial take-up exceeded 75 percent, and the training included weekly reminders and small cash-prize lotteries to keep women attentive and engaged; chat rooms with weekly prompts were introduced to replicate the networking features of in-person interaction. In spite of this, only 22 percent of participants completed the curriculum. Although the lack of impact across both delivery modes suggests the training content itself may have been ineffective, the particularly low completion rate for the app-based version highlights potential limitations of digital delivery, such as low engagement and drop out. In this context, the app-based training—which included reminders, incentives and chat rooms—may have lacked the commitment devices in-person training offers. The average cost per person assigned to receive the app-based training was USD 278, which was 54 percent of the cost of in-person training.

- SMS-based business training in Kenya had no impact on microentrepreneurs' business activity, knowledge, sales, profits or survival twelve months after the intervention (Mehmood, 2024). Three months after the intervention, knowledge and adoption of best practices significantly increased, and there were nonsignificant but positive effects on sales, profits, and business survival. Notably, female participants experienced significant negative impacts at the middle and end of the intervention for sales and profits. The training covered business best practices over 150 text messages in narrative form describing the decision-making of hypothetical micro entrepreneurs in different scenarios. The content was pushed to users through an interactive chatbot that they had to keep engaging with by replying to its messages in order to keep receiving content. Researchers found that participants stopped interacting with the SMS content within the first few months, which is likely responsible for the lack of long-term effects. Individuals in the program were willing to pay a small amount for an additional SMS training (per a willingness-to-pay survey administered after the training), which suggests they valued the content. As such, it seems that disengagement may

be due to motivation or the delivery format. The organization running the training only had to spend 10 Kenyan Shillings (KSH) (about USD 0.07) to provide the full training to each additional participant.

- A live business course delivered via Zoom video conferencing in Mexico and Guatemala with self-employed women found positive short-term effects on adoption of planning and accounting practices (28 percent and 13 percent increase, respectively) and monthly sales (24 percent increase), but the effects disappeared after six months (Davies et al., 2024). The course was delivered in nine two-hour sessions that focused on planning, accounting, marketing, and resilience/personal initiative with relatively high engagement, as 61 percent of participants completed all nine sessions via their own mobile devices. Women adopted some new business practices during the training but abandoned them in the long-term, likely contributing to the lack of sustained sales impact. Furthermore, women did not adopt improved marketing practices, which likely hindered their ability to sustain or grow sales. Researchers noted the marketing content was ineffective and could be improved by providing more specific actionable steps. The estimated cost per participant in Zoom training was USD 50 in Mexico and USD 56 in Guatemala.



- A one-week (15-hour) Whatsapp training had no impact on business practice adoption, firm survival, or profits, and revenues among microentrepreneurs in Brazil (de Oliveira, 2024). The training content was delivered in video and audio formats, and covered innovation, business finances and accounting, negotiating with suppliers, selling and advertising online, and strategic planning. When the training was combined with monthly reminders, deadlines and small monetary incentives (USD 4 or USD 8) to implement record keeping or marketing practices

for three months post-training, adoption rates (13–19 percentage points), business survival (8–10 percentage points) and the likelihood of having the firm as the only source of income for the owner increased significantly (16–18 percentage points). The incentives intervention had no impact on profits or revenues.

- Researchers in rural Uganda tested the effects of delivering agricultural extension information via a 10-minute video on improved maize management practices, framed as an inspirational story (Lecoutere et al., 2019). The video was shown either to the female co-head alone, the male co-head alone, or both together. Providing information to women alone had substantial impacts²: their knowledge of improved practices increased (by 0.13 SD), their decision-making power across agricultural domains rose by 9–10 percentage points, and adoption of recommended practices increased by 1–5 percentage points. Women expanded the area of maize under their management, leading to higher production, improved yields, and a greater share of household maize output under female control. In contrast, when women received the information jointly with men, male knowledge, adoption, and decision-making power declined. This reduction in decision-making power may create space for women's increased decision-making and involvement. To examine role model effects, the videos were produced in three versions featuring either male, female, or mixed-gender protagonists. Female-actor videos had no impact on women's outcomes when viewed jointly, and in some cases reduced yields. However, when viewed by women alone, the female-actor videos increased women's decision-making power and adoption of selected practices. There were also positive effects on jointly managed input use, production, and sales, highlighting the potential for tailored content and delivery to shift gender dynamics in agriculture.
- In Nepal, women were offered a hybrid distance training program to become Community Animal Health Workers, which provide animal health care in rural communities (Mullally et al., 2022). Two-thirds of the curriculum was completed on tablets across 30 days, with the remainder delivered in-person. The hybrid model increased the likelihood of becoming a certified worker by nearly 30 percentage points—about a 55 percent improvement over traditional in-person training—and significantly improved women's knowledge and management practices. While women improved employment, there was no impact on average income, likely stemming from COVID-19 mobility restrictions.

Hybrid training was especially effective for women with greater freedom of mobility, suggesting that traditional training requires a significantly higher level of mobility that is not common in this context. The hybrid model was also more effective for women with an infant—highlighting the flexibility offered by distance training—women from smaller households, and women from households with at least one migrant. Larger households may have more domestic responsibilities that interfere with even flexible training, and focus group respondents noted that women from migrant households could only balance their domestic responsibilities with a flexible training schedule. Including the tablet, the total cost of hybrid training per trainee was USD 428, which was the same as traditional in-person training.

2. DIGITAL NETWORKING AND MENTORSHIP

Networking and mentorship opportunities can play an important role in improving women's economic outcomes, given that women often have smaller and less diverse business networks. Emerging evidence suggests that digital tools—such as mobile apps and online platforms—can effectively expand access to these opportunities, with positive effects on women's business outcomes. Additionally, the quality and impact of mentorship may be shaped by shared identity and gender norms, with female mentors often better equipped to relate to and support the specific challenges women face in entrepreneurship.

- A virtual, gender-matched mentoring program improved business performance for women entrepreneurs in Uganda (Germann et al., 2023). Female owners paired with female mentors—experienced volunteers who met weekly via Skype/WhatsApp for 2–6 months—raised monthly sales by 32.4 percent (around USD 414) and profits by 31.4 percent (around USD 73), with the largest gains among high-aspiration women. Mentoring took place remotely through Skype, WhatsApp, Google Docs, and phone calls. Mentors met with entrepreneurs on a regular basis—sometimes several times a week—to discuss challenges, products, and finances. Beyond the broad goal of fostering business growth, mentors had full discretion in how they guided each entrepreneur. No effects were observed when female entrepreneurs were matched with male mentors, highlighting the importance of relatable female role models.
- A light-touch online networking program significantly improved outcomes for growth-oriented women entrepreneurs in Ghana (Asiedu et al., 2024). Female owners placed in curated WhatsApp groups of eight peers for 16 weeks boosted monthly profits by 21

²Effects when shown to the couple together were also positive, but smaller than when the female co-head viewed alone.

percent and improved business practices by 0.10-0.19 SD, while also raising the likelihood of introducing new or improved changes to their businesses. The “core” program included weekly one-on-one coffee-chat calls and a shared business directory, while the “enhanced” program added lawyer-led video lessons and free office-hour consultations. However, outcomes were not statistically different between the two, suggesting that legal support had no additional influence. Women experienced the biggest improvements when their WhatsApp cohorts included highly educated, high-performing peers from a mix of industries, whereas entrepreneurs in groups with a larger share of peers in the same-sector were less likely to improve. The intervention also reoriented collaboration patterns, replacing reliance on friends and family with new collaborations formed within the program’s business network.

3. DIGITAL BUSINESS SKILLS TRAINING

Digital skills training—including online entrepreneurial skills, online marketing, and freelancing—can open entrepreneurial and employment pathways for women, but their success hinges on context and program design. **Across six rigorously evaluated digital-skills interventions, four show clear gains in women’s earnings, employment or business performance** (Alhorr 2023; Aramburu et al., 2021; Atkin et al. 2021; Das et al. 2023), while two yield mixed results (Croke 2017; Fazio et al. 2025).

- Online digital marketing training and storefront support boosted growth for home-based women entrepreneurs in Jordan (Alhorr, 2024). Women entrepreneurs who were provided a Facebook business page, up to six months of ongoing page management, 30 short video lessons on digital marketing, and up to USD 20 in paid ads experienced a 7-percentage point increase in business survival, an 18 percent rise in weekly revenues, and a 20 percent boost in client base. The training, delivered through ~10-minute video modules, covered content creation, photography, and privacy-conscious marketing. Impacts were strongest among women facing limited physical mobility due to social norms, underscoring the power of digital tools to unlock economic opportunities for women.
- A part-time computer coding bootcamp for women in Argentina and Colombia led to a 9.2 percentage point increase in the likelihood of working in a technology job and a 12.7 percentage point increase in women either working or studying in the tech sector, a traditionally male-dominated field (Aramburu et al., 2021). The 16-20 week training was designed to prepare students for entry-level coding jobs and focused on basic programming skills in

demand in the labor market. Participants were first required to complete an assignment to demonstrate a minimum level of computer proficiency necessary to benefit from the bootcamp. Eligible participants received a scholarship to cover most of the tuition (65 percent in Argentina and 80 percent in Colombia) and were able to choose between in-person classes or a combination of in-person and online classes. Just over 400 women were selected for the program, of whom 70 percent enrolled and 85 percent of those who enrolled completed the training. Unexpectedly, the program led to a 9.8 percentage point decrease in the likelihood of being employed. This decline was not due to increased unemployment, but rather to a reduction in labor force participation—driven primarily by individuals who were dissatisfied with their jobs at the beginning of the intervention, suggesting the bootcamp may have led women to hold out in anticipation of better job opportunities.

- A classroom-based digital-skills program coupled with guaranteed job referrals significantly increased earnings for Nairobi youth (Atkin et al., 2021). Applicants randomly offered both the 10-day AI course (5 hours per day) and a job referral earned around 40 percent more and faced 10 percentage-point lower unemployment than the comparison group; women’s monthly earnings increased by 60 percent, and they worked 5.4 additional hours per week. The free training covered basic digital skills, occupational skills relevant to digital work and the business process outsourcing industry, and job-search preparation. The effects for the “training-only” arm were weak or even negative in the first two years, recovering later mainly for men. Earnings advantages for the training and job group persisted through COVID-19, when remote work insulated them from pandemic shocks.
- A four-month freelancing-skills program coupled with post-training mentoring improved labor-market outcomes for young (aged 18-35) Bangladeshi women (Das et al., 2024). Among the participants, those offered the course were 19 percent—or 10 percentage points—more likely to be employed, increased hours worked by 29 percent, and earned 40 percent more than the comparison group. Food spending, a measure of welfare, increased by 29 percent. The biggest gains were concentrated among women who were still in school at the start of the intervention. Training blended theory and practice across 50 four-hour sessions (three sessions per week) in graphic design, digital marketing, or web research and support; COVID-19 disruptions pushed about 55 percent of classes online. Participants then received at least two months of optional mentoring to refine their professional profiles on major

freelance platforms and provide guidance in their first assignments. The intervention proved highly cost-effective with an estimated benefit-cost ratio of 6.55, meaning that for every USD 1 spent, it yielded USD 6.55 in social benefits.

- A 10-week, classroom-based ICT-skills program helped Nigerian university graduates, especially women who doubted their own professional potential, secure tech jobs (Croke et al., 2018). Trainees received 85 hours of instruction in communication, computer software, and cognitive skills. They were also able to post résumés on an online employment platform, met recruiters at a sector-specific job fair, and sat for an industry-recognized certification exam. Two years later, participants were 26 percent more likely to work in an ICT position (a 1.7 percentage-point jump from a 6.4 percent at the start of the intervention), but overall employment and earnings were unchanged. The shift was three times larger (an increase of 5.7 percentage points) for women who, at the start of the intervention, showed implicit “pro-male” professional bias—evidence that targeted skills training can override self-defeating stereotypes without any gender-specific curriculum. Delivering the course cost roughly USD 606 per student, and impacts were concentrated among higher-skilled applicants and those in Abuja; women with pre-existing pro-female confidence gained little, hinting that networking support—rather than skills alone—may better serve that group.
- A 12-week, tutor-supported online freelancing training program guided Salvadoran job-seekers onto global gig platforms but failed to shift broader labor-market outcomes (Fazio et al., 2024). Participants completed eight asynchronous modules covering profile creation, proposal writing, client interviews, project management, billing, and an “English for Freelancers” add-on—while each was paired one-to-one with a tutor, who tracked progress and offered on-demand guidance. Individuals in the program were more likely to build an online profile, submit proposals, receive at least one client contact, and secure an initial contract, while also increasing self-efficacy. Yet it had no effect on the number of job offers, contracts, employment status, income, satisfaction, entrepreneurial spirit, and self-esteem. Poor initial job ratings may have hindered sustained freelancing success. Completion remained modest despite tutoring (39 percent finished the theory phase; 16 percent completed the full program). Delivering the package cost about USD 700 per participant, of which roughly USD 550 covered individualized tutoring.



4. ONLINE JOB PLATFORMS

Providing women with access to online job-matching platforms alone has shown limited impact on employment outcomes, especially in contexts where restrictive gender norms constrain their mobility. Limited evidence indicates that such platforms are more effective when paired with additional support—such as training on how to use the platform, improve online profiles, and strengthen job applications. These complementary components help women bridge information gaps and better showcase their qualifications.

- Adding a short LinkedIn training to South Africa’s standard job-readiness courses helped participants find jobs (Wheeler et al., 2022). Participants in existing job readiness programs received a four-hour module that walked them through creating a LinkedIn profile, advertising their skills, requesting recommendations, making connections, and searching and applying for jobs. The program also included in-person coaching and follow-up emails. The low-touch training increased employment by 7 percentage points (10 percent) and the advantage persisted for at least a year; cumulative earnings gains during those 12 months ranged from USD 420 to USD 1,100 per participant. Findings suggest that the program did not raise employment by channeling borderline candidates into poorer-quality jobs than those they would normally secure. Returns were strongest for candidates with weaker initial communication skills, echoing LinkedIn’s value for less-connected workers. At just USD 48 PPP³ per trainee, the intervention had an 8.7 benefit-cost ratio, meaning that for every USD 1 spent, it yielded USD 8.7 in social benefits.
- A job-matching platform aimed at improving women’s employment outcomes in low-income areas of Delhi ended up benefiting men more than women (Afridi et al., 2023). Married couples were offered free access to a digital platform that connected workers with nearby employers via phone calls—no smartphone needed. In one intervention group, this access was also extended to the wife’s social circle (“network arm”). One year later, women’s participation in work outside the home remained unchanged. However, women in the network arm were 4.5 percentage

³ Purchasing Power Parity (PPP) adjusts income or prices to reflect the real cost of living.

points more likely to take up home-based self-employment. In contrast, their husbands experienced significant improvements in employment: their likelihood of working rose by 4.4 percentage points, with increases in weekly workdays, daily hours, and monthly earnings. The findings highlight how traditional gender norms within women's networks can unintentionally shift the benefits of technology-based interventions toward men. Implementation costs were low—approximately 100 Indian Rupees (INR) (USD 1.20) per person.

- A one-time SMS invitation sent to recent Technical and Vocational Education and Training (TVET) graduates in Mozambique to register on digital job-matching platforms had no overall impact on employment outcomes, but led to clear gains for women in manual trades (Jones & Sen, 2023). Graduates received a personalized message (with a reminder after 10 days) directing them either to Biscate, a mobile-accessible platform connecting informal-sector clients with local freelancers, or to Emprego, an internet-based platform for formal job seekers. Follow-up surveys revealed no improvements in employment rates, job quality, or wages across the full sample, and life satisfaction declined slightly. However, women with industrial or construction qualifications who used Biscate experienced notable improvements such as an increase in paid work of 11 points, and both working hours and earnings increased by around 50 percent. While the intervention did not affect broader labor market trends, it helped reduce barriers for a specific group of jobseekers.
- In Egypt, women were offered active job-matching support through an online platform, with platform staff identifying and sharing at least three suitable job vacancies tailored to the women's criteria, and then applying on her behalf if interested (Caria et al., 2025). Nearly 50 percent of women were interested in job services and created an account on the platform, which included their preferences for location, occupation, salary, and working hours. Only 21 percent of women submitted job applications, and most women declined interviews when offered (48 percent according to administrative data; 85 percent according to data at the end of the intervention). Subsequently, there were no impacts on employment, hours of work, or monthly income. The evidence suggests this was due to a shortage of available jobs with the attributes women desire. Women declined to apply or follow through with interviews due to the job location being too far, unmatched preferences (needing a part time or online job), or unsuitable working days or hours.

While digital platforms can help reduce search frictions, they are unlikely to improve women's labor outcomes without a sufficient supply of jobs that align with their preferences. Addressing structural mismatches in job availability—particularly around location, flexibility, and working conditions—is essential to translating access to job platforms into meaningful employment gains for women.

5. FLEXIBLE JOB ARRANGEMENTS: DIGITAL MICROWORK

Flexible work arrangements that allow women to work from home—such as online gig work—may be an opportunity for women to participate in the labor market in contexts with restrictive gender norms.

Safety concerns, domestic responsibilities, lack of skills, and gender attitudes may prevent women from working, especially outside the home. Evidence from two studies suggests digital microwork, such as data entry, image tagging, and transcription, that can be performed from home while managing paid and household responsibilities is appealing to women in contexts with restrictive gender norms, and serves as an effective entry point into the labor force for women who may otherwise not have work opportunities.

- In India, women were offered at-home digital work or part-time office work in an environment designed for women's safety and comfort: the office was women-only, within a five-minute walk from home and permitted children (Jalota and Ho, 2023). Even when wages doubled household income, women overwhelmingly chose home-based work (56 percent) over office jobs (27 percent). Husbands played a prominent role in whether or not and where women worked: Over 40 percent of women rejected any kind of work due to their husbands disapproval. Among women who did work, most reported they were allowed by their husbands to work from home (42 percent), but this approval dropped for jobs outside the home (18-28 percent). Until gender norms constraining women's work are addressed, home-based microwork may be an effective strategy for integrating women into the labor force.
- In another Indian study, 48 percent of mostly married women with little previous work experience took up such at-home digital work while only 15 percent took on in-person office work (Ho et al., 2024). Two to three months later, women who had taken on flexible at-home work were six percentage points more likely to take up a less flexible job. This provides evidence that flexible work can act as gateway jobs to outside-the-home work, offering more opportunities for women's labor force participation.

Conclusions and Future Research Agenda

Digital technologies hold promise for expanding women's economic opportunities, yet their effectiveness depends on thoughtful program design and complementary support. Digitally delivered business-training courses can lower traditional gender, time, and mobility barriers, although current evidence shows modest gains in women's earnings and employment. At the same time, **virtual networking and mentorship platforms have begun to demonstrate measurable boosts in women's labor-market engagement, showcasing that technology can widen professional circles when it fosters sustained, high-quality connections.**

Equipping women with market-relevant digital skills creates new entrepreneurial and wage-employment pathways, but outcomes vary with context and

program design. Similarly, online job portals generate better placement rates when users receive hands-on guidance, such as improving online profiles or fine-tuning applications, underscoring the value of wrap-around support. Finally, flexible work arrangements, such as remote work, offer a flexible route into paid work for women constrained by restrictive gender norms. Together, these insights suggest that digital solutions can level the playing field for women regarding skills development, provided they are delivered as part of an integrated package that removes access barriers and supports sustained engagement.

While results are promising across multiple dimensions, further research is needed to better understand how to design, adapt, and sustain digital solutions for expanding women's skills and economic outcomes.

KEY AREAS FOR FURTHER RESEARCH INCLUDE:

- **Reducing Attrition in Digitally-Delivered Programs:** Online training programs frequently face high dropout rates and low completion levels⁴. For instance, a study in Ethiopia (Cassidy et al., 2024) found that while a smartphone-based training app attracted strong initial engagement—with 75 percent of participants starting the course—only 22 percent completed it. In contrast, 71 percent of those enrolled in the traditional in-person version finished the curriculum. This gap underscores the challenges of sustaining engagement in digital learning environments. To design more cost-effective and impactful digital programs, **it is crucial to identify the barriers to completion, whether they stem from low motivation, limited digital literacy, or competing demands on participants' time.** Equally important is identifying the mechanisms, incentives, or personalized elements that can boost completion.

A promising approach is a hybrid model that combines digital and in-person components—offering the structure and accountability of face-to-face engagement, while addressing common barriers—such as time, mobility, and caregiving responsibilities—through flexible digital access. For example, (Cassidy et al., 2024) also underscores the critical role of in-person information sessions for initial take-up, teaching participants to download, log in, and use the app, suggesting that brief, face-to-face support can help bridge the digital skills gap and supporting participants to gain the skills and confidence to get started. In Nepal, a 30-day hybrid training program—delivered two-thirds via tablet and one-third in person—boosted women's certification as Community Animal Health Workers

by nearly 30 percentage points, a 55 percent increase compared to the in-person-only version. This was especially effective for women with young children and greater freedom of mobility. Though evidence on hybrid models is limited, these findings highlight the potential to expand access and improve outcomes in contexts where fully in-person or digital may fall short.

Key questions include:

- Which design features—such as financial or social incentives, regular reminders, peer interaction, or live check-ins—can be most effective in reducing attrition and supporting learners through to completion?
- At what point in the training lifecycle are participants most likely to disengage, and how can early-warning systems help flag and re-engage at-risk users?
- How does the length, pacing, or format of the training affect sustained participation?
- What role do gender norms, household responsibilities, or internet/data affordability play in early dropout among women, and how can programs mitigate these barriers?
- In which settings, and for which women, are hybrid models significantly more effective than fully digital approaches?
- What is the optimal mix of digital and face-to-face interaction to maximize learning outcomes while keeping costs manageable?
- **Tailoring Program Content for Effective Digital Skills Development:** Digital training programs that focus on skills such as online marketing, e-commerce operations, and the use of digital platforms can play a critical role in helping women entrepreneurs grow

their businesses and reach new markets (Alhorr, 2024; Atkin et al., 2021; Das et al., 2024). Yet, evidence is still scarce about which content modules (social media, inventory apps, digital marketing, etc.) drive the most significant returns and how those needs vary by sector or stage of business growth, raising important questions about which digital skills are most relevant for women entrepreneurs.

Key questions include:

- Which digital skills are most relevant for women entrepreneurs across different business stages or sectors?
- How can training content be designed to reflect the constraints women face in accessing digital tools?
- Which instructional formats (self-paced videos, live lessons, AI-guided lessons) maximize learning and retention? And how can these elements be adapted for low-literacy users, informal businesses, or those with limited connectivity?
- Given the promise of consulting services in improving managerial capacity and firm performance, can digital tools, potentially leveraging AI, support more personalized advice for women business owners in a cost-effective manner?
- **Providing Complementary Support for Digital Programs:** To ensure participation in digital programs/platforms translates into meaningful business gains, it is important to consider not only the content of the training but also the broader support ecosystem needed to make that content usable and actionable. Complementary interventions—such as digital literacy training, psychosocial coaching, mentoring, or job-readiness support—may be essential to help women apply new skills effectively, whether in self-employment or gig work settings.

Key questions include:

- What types of complementary support—technical, emotional, or logistical—are most effective in enabling women to apply digital skills in practice?
- Which combinations of content and support lead to sustained business performance improvements?
- How can programs cost-effectively match women with mentors or peer groups at scale?
- How should complementary services evolve as entrepreneurs move throughout growth stages?
- **Targeting for More Effective Digital Training:** While digital technologies and online courses have expanded rapidly, many women continue to face barriers that limit their participation and learning. These include limited prior exposure to digital tools, low confidence navigating online platforms, and

competing caregiving responsibilities. In LMICs, for example, women are 15 percent less likely than men to use mobile internet (GSMA, 2024). To ensure digital training programs reach and benefit those who need them most, more research is needed on how to effectively target and tailor these interventions. Characteristics such as education level, prior digital or business experience, and time constraints may influence engagement and outcomes.

Key questions include:

- Which user characteristics best predict training success?
- How can digital training programs tailor training content and delivery to individual needs?
- Are certain training formats more effective for specific subgroups?
- How can artificial intelligence tailor training content and delivery to user needs?
- **Structuring and Organising Digital Networking and Mentoring Opportunities:** Strong business networks can help women entrepreneurs to adopt better practices, improve business performance, and expand their customer base (Asiedu et al., 2023). However, the dynamics of these networks—how they form, how trust is built, and how they shape business outcomes—are not well understood, and there is a need for more rigorous research. Digital platforms—from WhatsApp peer groups to virtual, gender-matched mentorship—offer promising avenues to expand women’s access to broader and more diverse professional connections. Evidence from Ghana showed that a light-touch WhatsApp-based peer group raised profits and encouraged entrepreneurs to move beyond close-knit ties, fostering collaboration with business peers (Asiedu et al., 2023). Still, women’s networks tend to remain smaller and more homogenous than men’s, and sustaining engagement beyond the short-term remains a challenge.

Key questions include:

- How can digital relationships be kept active once structured programs end?
- What is the optimal balance between peer diversity and industry relevance to foster effective learning?
- How can digital mentorship be delivered in cost-effective, scalable ways without compromising quality?
- Which matching algorithms or AI-driven tools best pair women with relevant mentors or peers?
- How large and diverse should virtual cohorts be before coordination costs begin to outweigh the benefits?

⁴Experience with asynchronous learning on MOOC platforms like Coursera reveals extremely high drop-out rates, around 90 percent, in developed countries (Rivard, 2013).

- **Demonstrating Cost-Effectiveness and Scalability of Digital Interventions:** Although digital delivery models are increasingly popular, robust evidence comparing their cost-effectiveness and scalability to traditional (in-person or hybrid) approaches remains limited—particularly in LMICs. Digital programs offer clear advantages in reducing costs and expanding access, especially in remote or underserved areas, by minimizing reliance on physical infrastructure and allowing for asynchronous, self-paced learning. However, challenges related to user engagement, platform navigation, and digital access persist, especially for women entrepreneurs, who may face constraints such as limited digital literacy, restricted access to digital tools, and lower confidence in navigating online platforms. Evidence on long-term impact and cost trajectories at scale is also sparse, making it difficult to understand the sustainability and overall return on investment of digital training.

Key questions include:

- What are the most effective strategies to scale digital entrepreneurship training programs in LMICs?
- Under what conditions can digital programs match—or even surpass—the cost-effectiveness and impact of in-person or hybrid models?
- What types of digital content and delivery formats (e.g., live, asynchronous, app-based, blended) are most effective for scaling and cost-effectiveness purposes?
- How do constraints such as intermittent internet access, limited device functionality, or gender-based barriers affect the success and scalability of digital interventions?
- What complementary supports (e.g., coaching, peer groups, technical assistance) are most critical to enhance the effectiveness of digital training at scale?



Appendix 1:

In-Person Approaches to Improving Women's Labor Outcomes Summary

- **Traditional in-person business training programs have mixed impacts on women's labor outcomes.** While some evidence finds positive effects for women's business knowledge and practices, there are limited or insignificant impacts on profits, performance and growth of enterprises (Siegrist, 2022). After attending business classes, female microenterprise owners in Kenya adopted some new business practices in the short term, but the effect disappeared four months after training, and there was no impact on profits (Brooks et al., 2017). Entrepreneurship and business management training provided to women entrepreneurs with established small businesses in Tanzania had no impact on adoption of business practices, or revenue or profits (Bardasi et al., 2017). A 2024 review concluded that traditional business training programs have negligible or low average effects for women (Ubfal, 2024), and a meta-analysis found a positive but non-significant effect of business training on profits (Chinen et al., 2018). Business knowledge may be a limiting factor to success for some women, but as a 2021 review notes, an explanation for the mixed impacts of business training may be due to other constraints women face, that cannot be addressed solely by training (Jayachandran, 2021).
- **Similarly, vocational training has mixed effects on labor outcomes for women.** A Technical Vocational and Educational Training (TVET) program in Mongolia led to increased paid employment (23 percent) and earnings (25 percent) for women (Field et al., 2019). Women experienced no impacts from a six-month long vocational training program in Colombia while formal employment increased by 19 percentage points for men (Barrera-Osorio et al., 2023). A 2018 meta-analysis found vocational training increased formal employment by an average of 8 percent and earnings by 5 percent though there is strong heterogeneity across dimensions such as location and program design (Chinen et al., 2018). A recent literature review notes mixed results and suggests vocational training will have limited impacts in the presence of other obstacles (Heath, 2024).
- **The effectiveness of in-person business training may be enhanced by incorporating content and implementation strategies that address the specific constraints women face.** Evidence shows that traditional business training programs that also included gender-oriented topics or soft skills had

significant effects on employment and business outcomes (Siegrist, 2022; Ubfal, 2024). While a traditional business skills and entrepreneurship training for women entrepreneurs in Ethiopia had no impact on profits, a training focused on soft skills such as self-esteem and goal setting led to 30 percent higher monthly profits (Alibhai et al., 2019). Business training that included a special focus on the role of gender in leadership with experienced businesswomen in Ethiopia led to improved business practices (0.13 SD) and sales and profits (0.21 SD) (Bakhtiar et al. 2022). In Kenya, women entrepreneurs were three percentage points more likely to survive after three years, earn 18 percent higher sales, and make 15 percent higher profits after participating in a training program designed for women that also included a soft skills module (McKenzie and Puerto 2017).



Women often have smaller and less diverse business networks than men, limiting their access to market information, business partnerships, and career opportunities. Evidence suggests that integrating peer-support mechanisms, networking opportunities, and mentorships into training programs had positive effects on profits, business practice adoption and business scaling. Field et al. (2016) demonstrated that when women were permitted to bring a friend to business training, they doubled their demand for loans, expanded their business activity and had higher household income. In Chile, business training that included role models led to increased sales, profits, household income, business ownership and degree of formalization (Lafortune et al., 2018). While traditional

business training had no impact on profits, one-on-one mentoring for female micro enterprise owners in Kenya increased profits by 20 percent, though this effect fades once the mentoring relationship concludes (Brooks et al., 208).

- **Light-touch job readiness training may improve employment outcomes for women in some contexts. Signaling one’s skills through a reference letter or certification, and a job application workshop that taught participants how to apply and interview for jobs improved women’s employment outcomes.** Assessing a range of work seekers’ soft skills and providing a certificate of results to use for job applications increased employment by 17 percent, weekly earnings by 34 percent and hourly wages by 20 percent (Carranza et al., 2022). In South Africa, researchers found that including reference letters from former employers with the job applications of women led to significantly more job interviews and employment (Abel, Burger, and Piraino 2020). A two-day job application workshop focused on effective strategies for composing curricula vitae and cover letters and approaching job interviews in Ethiopia increased participants’ probabilities of finding stable formal jobs, and increased earnings and employment rates among the most disadvantaged job seekers (Abebe et al., 2021).
- **Improving women’s labor outcomes may require more than training—reducing search costs and expanding access to childcare are strategies that address structural barriers to women’s employment. Evidence suggests reducing search costs among women is effective.** Subsidizing application costs, providing transportation reimbursement and

facilitating access to information on job vacancies has positive impacts on women’s employment outcomes. A study in Ethiopia provided a small monetary payment to job applicants to reimburse them for transport costs and the time spent applying for the job (Abebe, Caria & Ortiz-Ospina, 2021). The payment improved the quality of the applicant pool, with the impact driven by women and jobseekers who were unemployed. In Pakistan, where women face limited safe mobility options, offering women-only transportation led to increased job search activity (Field and Vyborny 2021). Providing transportation to women in India reduced commuting time that enabled skilled employed women to work more hours while unmarried unemployed women were able to intensify job searches (Chen et al., 2024). Attending a job fair led to a 10.6 percentage point increase in reported formal sector employment in the Philippines (Beam, 2016). In the Republic of Congo, providing women with information about trade-specific earnings led to a 28.6 percent increase in women applying to traditionally male-dominated and more lucrative trades (Gassier, Rouanet & Traore, 2022).

- **Childcare responsibilities have long been an obstacle to women’s participation in the labor market. There is robust evidence that improving childcare availability increases women’s labor supply** (Heath, 2024). Interventions such as vouchers for subsidized care, free public preschool programs, and free after-school programs have been shown to increase women’s employment and labor force participation (Barros et al., 2013; Clark et al., 2019; Halim et al., 2019). Recent research has found that community-organized childcare is also impactful (Ajayi et al. 2022; Donald et al. 2023).

Appendix 2: Studies Included in the Literature Review

For readers interested in reviewing the studies included in the literature review and selected study characteristics, please refer to the full study chart available [here](#).

Impacts are organized by category in the columns titled “Sales/Profits” through “Employment.” For some viewers, check marks indicating positive results may appear as a square mark (□) depending on device or formatting settings; an em dash (—) indicates nonsignificant/inconclusive results; an X indicates no impact; a XX indicates negative results; a hyphen (-) indicates no relevant outcomes measured.

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