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The Digital and Digitally Enabled Economy as A Driver of Women Employment?

The Case of Jordan

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Abstract:

As structural change pushes countries toward technological innovation and digital transformation, there is increasing discussion how this affects the future of work for women. This paper looks at factors that foster or inhibit Jordanian women's paid work in the digital and digitally-enabled economy in Jordan, a country with very low female labour market inclusion and restrictive gender norms, yet comparatively high female education and political willingness for labour market reforms. This makes it an ideal case to probe into possible effects of the digital economy and digital tools on barriers to women's labour market inclusion.

Based on desk research and qualitative interview data, our findings show a mixed picture. Despite the relative successful development of Jordan into a "hub" for ITC-related services and a sizeable female workforce contributing to this sector, the impact of digitalization on women's labour market participation outside the 'ICT sector proper' remains rather slim. Digital tools have, so far, not meaningfully reduced labour market barriers for women but rather helped them to cope with them: Reputational gains to work in the white-collar digital economy are strong, but have not reduced gender norms on appropriate workplace or work tasks. Despite new regulations, the flexibility of remote work is not leveraged effectively to reduce barriers connected to women's mobility or time constraints due to care work. Previous labour market segmentations and inefficiencies continue and are reproduced by a split between the digital and the digital-enabled economy. These findings do not bode well for other country contexts with a less favourable baseline in term of education or regulatory changes.

JEL classifications: J16, J22, J23, J24, O14, O33

Used abbreviations:

DDE	Digital and digitally-enabled economy
DoS	Department of Statistics
EMV	Economic Modernization Vision
FLFP	Female labour force participation
ICT	Information and communication technology
MENA	Middle East and North Africa
MoDEE	Ministry of Digital Economy and Entrepreneurship

1 Introduction[1]

Female labour force participation (hereafter: FLFP) in countries of the Middle East and North Africa (MENA) region remains stunningly low, despite women's comparatively high educational achievements and high academic and policy interest. Structural change provides new opportunities in growth sectors, notably in the dynamic digital and digitally enabled (hereafter: DDE) economy[2]. Technological progress gives rise to hopes about job creation in the digital economy, also for formerly disadvantaged groups at the labour market, such as women. Yet, we lack a better understanding of to what extent and under which conditions the digital transformation[3] catalyses job creation and enhances labour market outcomes for women.

This knowledge gap is particularly interesting in the Jordanian case because the country continues to have one of the lowest FLFP despite relatively high female educational achievements and an enduring high interest by policy makers and international donors. The policy interest has even been demonstrated in the ambitious and detailed reform strategies regarding both, digital transformation and women economic empowerment. This paper sheds light on the underlying decisions and trade-offs of female labour market inclusion in Jordan's digital or digitally-enabled sectors. It explores preliminary answers to the following research questions:

RQ1: To what extent does the DDE economy create (female) employment? In which sectors?

RQ2: Through which channels does employment in the DDE economy ease women's barriers to labour market inclusion? For which women?

The paper finds that the DDE job opportunities stay limited and selective to certain groups of females, mostly in higher-skilled occupations and subsectors. While the conditions in the DDE alter barriers to female employment, the connection is not straightforward: Digital tools have not reduced gender norms on appropriate workplace or work tasks but rather helped women to cope with them. Reputational gains for women employed in the white-collar digital economy are strong, but working in digitally-enabled sectors enjoys no good reputation. Despite new regulations, the flexibility of remote work is not leveraged effectively to reduce barriers connected to women's mobility or time constraints due to care work. Previous labour market segmentations and inefficiencies continue and are reproduced by a split between the digital and the digital-enabled economy. The possibilities of the digital transformation are thus not reaped in a systematic and broad-scale way. There are indications

[1] I am most grateful to the participants of the workshop 'Gender-responsive social protection and employment policies in low and middle income countries' in November 2024 for their very helpful comments. In addition, I thank Nervana Khella and Ravi Mathews for their great support in translation and data preparation. All remaining errors are mine. Research for this article was conducted in the project *Feminist employment policy: women, structural change and labour markets in MENA and SSA* funded by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Sector Project "Employment Promotion in Development Cooperation", on behalf of the Federal Ministry for Economic Cooperation and Development (BMZ).

[2] This paper uses the term DDE economy to denote all economic activities relying on digital tools in their value adding process, for a rough typology see Table 1 below. Similar attempts to capture the effects of digital tools in different economic sectors include GIZ's (2019) focus on tech and tech-enabled start-ups, as well as Selwaness et al.'s (2022) definition of ICT jobs as ICT occupations in ICT industries, ICT occupations in non-ICT industries as well as non-ICT occupations in ICT industries.

[3] This paper uses both terms digitalization and digital transformation interchangeably. While digitalization refers to broad economic and social changes, digital transformation is even broader and captures changes at the mindset level. In contrast, the term digitization very narrowly denotes the 'translation' of paper-based information into digital bits and bytes (e.g. Gradillas and Thomas, 2023).

that the DDE economy creates female employment but hardly activates the hidden reserve of female first-time job seekers.

The analysis proceeds as follows: After some notes about the applied methodology, Section 2 presents the conceptual background, scrutinizing the literature for assessments on our two competing causal mechanisms: The DDE as a modern growth sector and job creator within the logic of structural change (2.1); and the digital transformation as a potential emancipation tool and job motor for women in particular (2.2). Section 3 focuses on our case study Jordan, first characterizing the extremely tight labour market situation in general and for women and the high political will and recent strategies adopted towards strengthening the DDE and FLFP. The subsections consider the relative importance of the DDE as a relative new growth sector for (female) job creation (3.1) and the role of digital tools in countering barriers to female labour market inclusion (3.2). The paper closes with a summary of the DDE as a catalyst for job creation for Jordanian women, and the relative explanatory value of it being a new economic sector and of the specific opportunities offered by digital work tools. We also shed light on policy recommendations and aspects that require further research.

Methodology

The paper employs a case study approach combining an in-depth literature review from different disciplines (e.g., labour economics, gender studies, technology and innovation) and a review on available statistics (e.g., DoS Jordan) with exploratory qualitative data collection. A round of semi-structured expert interviews (N=30) concluded in spring 2024, with a non-representative sample of stakeholders such as entrepreneurs, representatives of business associations, women associations and international donor agencies, as well as local researchers and government officials (see list of interviewees, annex 1). As this research scrutinizes three different areas of research – labour market issues, gender norms and digital transformation – dedicated questionnaires for all three issues and intersections between them were developed and adapted to the different target groups. Despite the different focal points, all interviewees were asked about recent changes and continuities in female employment in Jordan over recent years and main reasons for failure or success.

Interviews took place in Amman, or by video call. Most exchanges were held in English language, occasionally German or Arabic was used; most interviews were recorded and transcribed. The transcripts and notes, as well as relevant policy documents were coded using Atlas.ti. For reasons of confidentiality, interview quotations are fully anonymised. Arabic and German quotations are directly translated into English and *not* labelled as translation to protect the interviewee's identity.

The analysis follows a qualitative approach because it provides the opportunity to assess both social and economic factors and their interdependence. Especially the former aspects are guided by subjective calculus and not easily quantifiable, such as social gender norms and their 'stickiness', the reputation of the new and 'modern' digital sectors, but also remote work which is not always captured by standard employment measures (Bandiera 2022:2258). Thus, in contrast to existing quantitative studies regressing technological change and employment data to establish correlation, the paper at hand considers possible causalities between the DDE economy and female labour market inclusion. It intends to fill the gap between micro accounts (women's labour market decisions in contexts of restrictive social norms) and macro studies on technologies and structural change.

2 Literature and conceptual framework: women, structural change and digital economy

There are high hopes that the adoption of digital technology and women's economic empowerment go hand in hand, moving countries closer to achieving three of the SDGs: SDG 5 (gender equality), SDG

8 (decent employment) and SDG 9 (industry and innovation). This section provides a rough overview on how these thematic areas – gender, employment and technological innovation – have been interlinked in the academic literature to date, informing the case study on Jordan below. Two sets of literature are particularly relevant, (i) literature on the future of work, dealing with job creation versus job losses through digitalization, and (ii) literature on women economic empowerment, including gender roles and social norms. Section 2.1 thus looks at digital transformation and its labour-intensity (or labour-scarcity), section 2.2 deals with FLFP in relation to digital transformation.

2.1 Structural change: digital jobs in latecomer economies?

Digitalization is a pervasive and encompassing global megatrend shaping economies worldwide. While Asian countries in the 1960-1990s still successfully relied on industrialization as development model, building up competitive manufacturing "smokestack industries" (e.g. Newfarmer et al 2017) became more difficult. Instead, lower-income countries prematurely deindustrialised (Rodrik 2016) and focussed on higher-value added service sectors (Hallward-Driemeier & Nayyar 2017; Nayyar et al 2021), especially tradable services that form an inherent part of global value chains. Thus, while "'smokestack industry'—was regarded as the key driver of structural transformation", now other sectors like tourism, agro-industry or ICT (Newfarmer et al 2017:2) work toward structural change and productivity gains. Investing into digitalization across agriculture, industry and (especially tradable) services seems thus to be a more promising pathway to economic development for low- and middle-income countries than latecomer industrialization.

An emerging field of study, dubbed "Future of Work" has identified digitalization's major impacts on employment. These impacts stretch from (i) promises to (ii) challenges and (iii) risks.

(i) Digitalization's promises include greater efficiency, in terms of costs, labour-augmenting human-machine collaboration, more flexible work arrangements and the possibility of self-directed reskilling. In terms of greater efficiency, digital streamlining of economic processes opens up new avenues to economic development, as it lowers transaction costs and at the same time customization to clients' needs. These economic advantages are the main reason for the adoption of digital technology (for historical accounts, see Autor 2015; Brynjolfsson et al 2019). Goods and services can be exchanged much quicker, cheaper and to more recipients, even where transportation is scarce or economies of scale do not apply. First, the marginal costs are close to zero as digital items and transactions can be copied and re-run or downloaded by an indefinite number of people at no additional costs. Second, efficiency is also spurred by human-machine collaboration, as human productivity can be enabled by machines, leading to major labour augmentation (e.g. Frank et al 2019). Third, digital tools provide more flexible work arrangements. Cases in point are the shift to online labour during Corona pandemic , the possibility of generating a second income at flexible hours, or serving customers that are far away (e.g. African online workers, see Melia 2020). Finally, digital tools also extend to people not yet on the labour market. Increasingly with tools of artificial intelligence, especially large language models, job-seekers are empowered by digitally based self-directed learning tools. In their own speed and considering their preferences in learning styles, they gain access to reskilling (e.g. Melia 2024).

(ii) Digitalization's challenges encompass mainly bottlenecks in infrastructure and skills on the input side, and global competition as output. Both inputs, infrastructure and skills, can be a problem on national, firm and individual levels and different measures have been developed to look at them. For instance, internet and computer usage rates account for digital access on the individual level; figures on innovation or R&D investment do so on firm level, and indices like the Network Readiness Index, the Inclusive Internet Index or the Digital Inclusion Index (e.g. Selwaness et al 2023: 32 application to Egypt) are attempts to assess digitalization on country level.

- Digital infrastructure is understood mainly in terms of internet connectivity or speed, which was found to have positive employment effects in several developing countries (e.g. Chiplunkar & Goldberg 2022, Höckel et al 2024; Viollaz & Winkler 2021), but also in terms of digital hardware such as mobile phones (Fernandez et al 2024), computers or laptops (e.g. AlAzzawi 2023). While internet connectivity is a public investment and thus a national responsibility, hardware is an investment at individual or firm level. Scholars have tried to gauge firm's uptake of digital infrastructure and connected productivity gains. Farley & Langendorf (2024:4) review literature on productivity gains through digitalization in SMEs in Global South, and identify opportunities for MENA countries through high connectivity (e.g. undersea cables) or, on firm level, the usage of email communication and social media, but less so of websites. Zhu & Luo (2023) and Zaki (2023) find promising signs that the DDE economy in the MENA region might be part of the solution to weak firm performance and labour demand, respectively.
- For digital skills, keeping pace is difficult as digitalization is quickly evolving and ranges from more basic, everyday usages like social media, to more advanced new technologies, including automation, robotics, artificial intelligence (AI), cloud computing, or blockchain. Technological change is skill-biased (Acemoglu & Restrepo 2020), yet sectors and skill levels, that would maximize job creation, differ across contexts. Typically, DDE jobs at the middle of the skills spectrum, involving routine tasks, are most endangered to fall prey to automation (see iii below), as lower-skill jobs are often place-based and physical (e.g., ride-hailing tasks) and especially in LMICs are not well-paid so technical substitution (e.g. by autonomous cars) is not cost-effective. On the other hand, jobs requiring higher-level digital (and other) skills and involving managerial and decision-making responsibilities were long thought to be save from automation. Yet, the advent of AI has put many while collar jobs at question, too.
- The biggest challenge, however, is arguably finding a suitable niche for selling digital products and services despite high international competition, as will be seen in the case of Jordan (section 3.1).

(iii) Digitalization's risks, in terms of employment, are largely two-fold: first, job losses due to automation and, second, poor working conditions as platform work relegates human labour to a mere technology-augmenting position.

- Automation and job displacement: If efficiency gains through digitalization boost profits and competitiveness, this may not only cut costs but also jobs. Several scholars have tried to gauge job creation against job losses or job displacement through the increasing automation of work tasks (e.g. Autor 2015, Frey and Osborne 2017, Frank et al 2019). Yet, since technology plays also a labour-augmenting role in existing occupations, it is difficult to detect which jobs are created, which are destructed, and which simply change in their nature. Problematically, skill-intensive services that best contribute to export and global value chains "typically shed labor; labor-absorbing sectors typically have the worst productivity performance" (Rodrik 2018:12-13). The rise of artificial intelligence galvanizes this risk, as it often focuses rather on the substitution of costly labour rather than augmenting labour through 'the 'right' kind of AI' (Acemoglu & Restrepo 2020). For MENA countries, Hatayama et al (2020) identify a relatively high risk of automation due to the in international comparison relative low productivity and high share of routine tasks.
- On working conditions, a vast literature exists especially in relation to platform work (e.g Cook & Rani 2023; Heeks et al 2021; ILO 2021; for Jordan: Fairwork & Phenix 2023; ILO 2023). As a flipside of flexibility, the vast majority of platform workers lack formal employment status and social insurance coverage. Platform operators let them work "under app-usage terms and

conditions rather than contracts" and define themselves as mere providers of a labour-matching technology rather than employers (Heeks et al 2021:8). Workers are thus freelancing pseudo-entrepreneurs, as they cannot to take their own business decisions such as pricing. Further, they are curbed by high fees to the platform provider (e.g. ETF 2023: 10), digital monitoring at the workplace (Duggan et al 2019) and lack of worker's groups and unionization.

The trade-offs between digitalization's promises, challenges and risks are considerable, and even if challenges and risks can be successfully curbed, opportunities and promise of digital transformation will not by default have immediate and visible employment effects: unrealistic hopes, statistical mismeasurement, unequal gains and a time lag due to lagging implementation can stand in the way.[4] Furthermore, such risks and opportunities play out differently in different contexts. As Cook & Rani (2023:3) remark, studies on digital transformation and employment often very strongly focus on economic growth rather than what this exactly means for workers and employees. Furthermore, Cook & Rani (2023) observe that studies on the digital transformation-employment nexus in advanced economies tend to emphasise the associated risks (automation and job losses, costly retraining) while publications on developing economies rather focus on optimistic "'catch up' – or even [..] 'leapfrog'" scenarios (job creation, market access) and hope for productivity convergence with HICs (Rodrik 2018). The present paper tries to systematically gauge risks and opportunities, focusing on opportunities and challenges of digital job creation for women.[5]

2.2 Female labour force participation: digital economic empowerment?

It is clear that the future of work discussion will significantly affect female employment, yet the different factors why and to which extent digital tools can remove barriers to female labour market inclusion have not been addressed and analysed in sufficient depth. While there is a growing number of case studies on women and digitalization (e.g. Fernandez et al 2024; special issue by Rani et al 2022; Selwaness et al 2023), there are few conceptual approaches how digital tools may empower women economically.

As a starting point, there a vast and growing literature on female labour market participation and barriers to female women employment, discussing gender inequality against the background of economic development, but without a focus on digital transformation (e.g. Bandiera et al 2022; Klasen et al 2021; Santos Silva & Klasen 2021; Stöcker & Zintl 2024). Social norms are found to be the root cause that undergoes only slow changes (e.g. Barnett et al 2021; Felicio & Gauri 2018; Klasen 2019; Munoz Boudet et al 2023). A big part of the story are factors that reduce female labour supply – if women do not join the labour market because of time constraints due to care work or because of social stigma, for instance against women working in mixed-gender teams,[6] in public, or in hazardous or physically demanding tasks (Zintl & Loewe 2022). Female labour supply thus hinges on jobs being compatible with several norms conditions: for instance in white-collar occupations and parts of the service sector (Bandiera et al 2022; Klasen et al 2021). Especially in MENA countries, patriarchal gender norms are strong and women tend to wait for respectable jobs in the public sector, or not work at all (e.g. Krafft & Assaad 2020). Another part of the story are structural disadvantages to women on the

[4] Analogous to Brynjolfsson et al's (2019) explanations, why the rise of AI technology has not, or not yet, translated into higher productivity in international statistics.

[5] However, questions of job displacement cannot be addressed in depth here, and would warrant a separate study building on other sources.

[6] For Jordan, social expectations tend to discourage women from working in mixed-gender workplaces out of fear of harassment (e.g., Felicio & Gauri, 2018). Barnett et al. (2021) found that Jordanian women did not apply to jobs in mixed-sex workplaces, even if income was higher, while Zintl & Loewe (2022) found for women in temporary public employment schemes that personal preferences differed between female-only vs. mixed-gender work teams.

labour demand side. In some contexts there is considerable employer discrimination as women are less flexible in their work times, are perceived as more costly in terms of possible maternity leaves or absences due to child illness. Kaasolu et al (2019) suggest to analyse such employer discrimination as an unexplained gender wage gap.

Against this backdrop, expectations are that digitalization's promises and challenges are particularly strongly pronounced for women and other groups marginalized on the labour market. On the one hand, the DDE economy provides more flexibility, which eases mobility-restricting gender norms or care responsibilities. On the other hand, the digital gender gap and the automation and restructuring of businesses may limit these opportunities. We systematise the possible digital promises and risks for female employment, grouping them under two enabling and three limiting factors.

(i) Digitalization's promise to incentivize higher female employment mainly touch on two issues, flexibility and, closely connected with it, appropriate work tasks.

- Flexible work arrangements: Going digital is seen as a promising option for bringing more women into paid employment especially because digital work formats' flexibility across time and space – both for hours worked (including intermittent hours that allow for engaging in paid work despite care or household responsibilities, e.g. Rani et al 2022) and for workplace (remote office). Remote work can thus enable women to enter the workforce despite (i) the lack of efficient, safe and affordable transport services, (ii) shortage of good quality and affordable care services for children and the elderly, (iii) household chores and other responsibilities often perceived as female tasks, and (iv) a shortage of employment opportunities suitable to women in remote areas. A micro-level study by the Jordanian NGO Tamkeen (2018: 21-23) lists the advantages of digital work formats in detail and highlight their particular importance for female workers: convenience, higher productivity, less employee absences, better time use, less stress, cost saving e.g. for transport, flexibility of schedules and freedom to take breaks, higher loyalty to company and job retention. Amenability of work tasks to remote work feed hopes that women will not stay outside the labour force long or even permanently after the birth of a child because it enhance their labour market attachment and career development (e.g. Bonacini et al 2024). Many of these advantages apply to other marginalized or less mobile populations, too (e.g. physically disabled, elderly, rural).
  Some scholars establish such a link between female employment and teleworkability. For instance Hatayama et al's (2020) study of 53 countries projects shows that a relatively high share of MENA women work in occupations amenable to remote work. While they find that rather few jobs overall are suited for remote work, the probability in the Egypt, Jordan and Tunisia is considerably higher for female and educated workers, and somewhat higher for formally employed and younger workers. Notably, women in MENA are double to triple as likely to have jobs amenable to working from home as the other countries studied (ibid: figure 6). This is largely in line with AlAzzawi's (2023) study on teleworkability in five MENA countries, also showing that female, educated, formally employed, yet, in contrast, *older* people are more likely to work in a teleworkable jobs.
- Appropriateness of work tasks: While there is a large range of work tasks in the DDE – especially for digital tools as a general purpose technology – the general perception of digital or digitally-enabled jobs matches the above-mentioned gender norms (e.g. Selwaness et al 2023), as IT deskwork does not involve physically demanding or dangerous work tasks.

(ii) Digitalization entails some challenges and risks for women employment. We focus on higher risks of job displacement and poor working conditions in female-dominated sectors of the DDE, and the

digital gender gap. These challenges seem to be particularly daunting and severe at the intersection of groups with difficult labour market access, such as rural women or female migrants.

- Job displacement and female-dominated sectors: So far there are hints from the literature that female-dominated sectors are more affected by job loss and automation. Women more often than men work in automatable jobs (e.g. twice as many women in the UK, Roberts et al 2019). While DDE jobs could open up new employment opportunities in previously male-dominated fields (Bandiera et al 2022, Rani et al 2022), first empirical evidence shows that the relationship is more complex. A study on the apparel, footwear and automotive sectors in five countries in Europe, Latin America, and Asia (Fana et al 2024) shows that automation does not affect the differentiation into female- and male-dominated sectors as gender stereotypes and career preferences stay unchanged. In Egypt, Selwaness et al (2023:25) identified "data entry, receptionists, call centres & operators" as female-dominated ICT-related occupation vs. "electronic fitters, mechanics & assemblers" as male-dominated. Working conditions and job security in these lower-tier ICT jobs are often lower and eventually might be at the risk of automation if bots assume the tasks of tele-operators, yet Selwaness et al (2023) do not look at the risk of automation in ICT-related occupations, in particular. Generally, there is less literature on the effects of automation on non-manufacturing jobs, for instance by skill-biased technological change in the DDE sectors.
- Working conditions in the DDE: Literature shows that poor working conditions in platform work affect women more severely than their male colleagues as they have less means to navigate the risks due to higher vulnerabilities (Rani et al 2022). This includes security risks for place-based platform work (e.g. Fairwork & Phenix 2023; ILO 2021) a higher risk of discrimination due to online harassment and fakes (e.g., ILO 2021), and discrimination by AI programmed using sources and algorithms with inbuilt male biases. So, as a flipside of flexibility, platform work may in fact lock women into poorer working conditions and often stand in contrast to the highly reputable office jobs discussed above. Likewise, looking beyond platform work, Selwaness et al (2023) show a positive trend for female labour in the Egyptian ICT sector but at dropping shares of social security coverage. Beyond these risks, there are further challenges that come with the flexibility of remote work, including a lack of motivation and commitment, or overworking and a double burden in work-life-balance, (Tamkeen 2018: 25-26) or less access to public spaces.

  Fair working conditions also include fair remuneration, so another point with special relevance for women workers is the effect of remote work on wage levels and the gender-wage gap. Bonacini et al (2024) show that both sticky floor and glass ceiling effects[7] in wage distribution are strong for those in jobs with higher remote work amenability, and in particular for older and married women but surprisingly not consistently for women with children (possibly also to self-selection, as women might put up with lower paying positions to stay in the labour force). This study focuses on Italy, a high-income country yet with relatively traditional gender roles, so findings may be to some extent transferable to MENA countries.
- Digital gender gap and skills mismatches. Despite progress over recent years, women in many world regions still have unequal access to technologies, both in terms of connectivity, digital devices and digital skills; to a larger extent, they lack awareness about available digital tools and relevant information (e.g. Fernandez et al 2024). Thus, the vast majority of the above-mentioned literature on digital infrastructure and skills (see 2.1) takes account of the digital gender gap. For the MENA region, most accounts point to a steady progress in shrinking the

[7] The glass ceiling effect refers to a wider gender-wage gap at the top of the wage distribution, while the sticky floor effect denotes a wider gap at the bottom of it (Bonacini et al 2024:3).

digital gender gap but with mixed findings on how this progress affects FLFP. Viollaz and Winkler (2021), for instance, suggest that the rollout of mobile broadband in Jordan between 2010 and 2016 led to higher FLFP, especially amongst women unmarried in 2010, yet these women mostly contributed to a rising female unemployment rate. Cusolito et al (2021:32) confidently forecast, based on the diffusion of digital payments as a proxy for digital transformation, that FLFP in MENA could "almost double, from about 23 percent [in 2017] to more than 45 percent [by 2049]."

3 Jordan's digital(ly enabled) economy and women employment

Jordan is confronted with a difficult economic situation and persistently tight job market. After providing a brief overview of these interdependent challenges, we discuss Jordan's efforts and development of employment creation in the DDE (section 3.1) and the DDE's significance in terms of women's labour market access and outcomes (section 3.2).

Jordan is a middle-income country. As a small, open economy in a conflict-ridden region, it draws few foreign investors but relies to a large degree on international donors. Governance indicators give a mixed picture. Competitiveness and integration into global value chains is rather poor. Without an abundance of natural resources (exception potash and phosphates) and low agricultural and manufacturing contributions to BIP, Jordan mostly relies on the service sector, esp. tourism, financial services, ICT, transport (GoJ 2022:13). Economic structure exhibits the for the region typical split between few larger state-owned companies and an abundance of small enterprises, with a missing middle. At the same time, there is a low tax base, high public debt and poor structural transformation due to patchy macroeconomic reforms (Saif & Tzannatos 2023).

Jordan faces a myriad of employment problems. Beyond one of the lowest FLFP rates worldwide (13.2% vs. 53.3% of men) and, still, high female unemployment (30.7% vs. 19.6% of men, Youssef et al 2023:13), which motivated the writing of this paper, youth unemployment and graduate unemployment are alarmingly high. Labour market entrants and inflow of refugees. Jordan needs an estimated job creation of 100-120.000 jobs annually to absorb new entrants into the labour market (ETF 2023) and the waiting period for new entrants[8] is accordingly high (Amer 2018). Yet this is just the tip of the iceberg as a large proportion of the population is economically inactive. Also for those in paid work, the labour market situation is difficult: informal or precarious employment. Labour market segmentation between public and private sector (different contracts duration, pay and working conditions). Underemployment and moonlighting, *wasta* and low job retention rates (Al-Araj & Bassaid 2020). In summary, all of the listed labour market challenges also have a female dimension and, despite high female educational achievements (WEF 2023)[9] and the fact that educated Jordanian women are economically more active (Youssef et al 2023) further depress Jordanian women's economic empowerment.

The Jordanian government has over decades embarked on an economic reform process to mitigate the economic and employment challenges. Yet, even at times of economic growth during the late 2000s Jordan's economy did not generate a meaningful number of new jobs (Saif & Tzannatos 2023, MoPIC 2011). Economic strategies recognize the need for quickened structural reform and private sector development also in innovative sectors. Cases in point are the recent and highly ambitious

[8] "After 59 months [almost 5 years!] only half of the men eventually get a job and only 31% of the women will also find a job." (Amer 2018:17)

[9] Next to Kuwait and Bahrain, Jordan is one of the few Arab countries which come close to gender parity in education, and Jordan even moves beyond gender parity for secondary and tertiary education, with more enrolled women than men (WEF 2023:23; 219).

Economic Modernization Vision for 2022-25 (EMV, GoJ 2022), envisaging ICT and digital economy as a core future service, or the issue-specific National Strategy for Digital Transformation for 2021-25 (MoDEE 2023), both coming with a detailed executive plan for implementation and optimistic goals. The same is true for the issue of female economic empowerment, where *Al-iistratijiat tamkiin al-mara fi ruyat al-tahdith al-iiqtisadii* (*Arabic*: Engendered Strategy of the Economic Modernisation Vision, Amawi 2023) and the National Strategy for Women for 2020-25 (JNCW 2020) reflect policy makers' enduringly high interest in boosting female employment. Likewise, international donors have been supporting both economic and gender reforms.

Notwithstanding all these initiatives and efforts, Jordan's economic situation has thus far remained precarious and there has been little change in FLFP. The continuously low FLFP is remarkable because, as many interviewees pointed out (Tamkeen 2018:19; IV 208, 209, 214, 220, 221), the worsening economic situation has been pushing households to seek additional income sources.

> It's economic need […] There is a need, for contributing to making more money at the household level and even at the individual level. So women are more encouraged to find jobs and get jobs, whatever job opportunities there are. […] Females who are employed are [even] more attractive to males, they are more attractive for marriage than, non-working females. (IV209)

The following subsections will thus look at the reasons and mechanisms behind these sobering figures, in terms of employment created by the DDE (3.1) and women's labour market access through digital means (3.2).

3.1 Is Jordan's digital economy a labour-intensive growth sector?

Since Jordan has a relatively small domestic market and little comparative advantage in the global economy, focusing on the DDE is a viable strategy. Investing in a "services-led development" pathway (Nayyar et al 2021) seems realistic, particularly since Jordan's manufacturing industries are rather week due to the relatively high wage level. The DDE is also less prone to regional crises and instabilities than, for instance, Jordan's sizeable tourism sector.

Table 1: Digital and digitally-enabled economy

	Digitalization digital ↔ digitally-enabled	
Formality informal ↔ formal	ICT sector	Private sector
	Online platform work & freelancers	Home-based businesses

Source: Author's compilation.

To understand to which degree Jordan's DDE economy opens up opportunities for (female) employment (RQ1), we need to compare between several sectors and types of employment as the DDE spans a wide spectrum of economic activities. Table 1 gives a simplified overview over the DDE by degree of digitalization and type of employment, as used by the present paper. Shown on the left, the digital economy can be distinguished into a formal ICT sector and informal online platform work. Reliance on digital technology is their defining feature, and a high share of them exports goods and mostly services globally, subject to international competition. Yet, they can also produce for the domestic market, such as freelancers accepting remote work tasks. On the right, the digitally-enabled economy is a merely analytical category, consisting of other economic sectors and activities that do

not by definition use digital technology but decided to use digital technologies in their business processes. Informal home-based businesses (HBB) sell their produce locally, while formal private sector companies of all sizes include exporters and non-exporters. The latter are thus a residual category which will require further differentiation by future research.

(i) Employment in the formal ICT sector

The ICT sector is a focal point in Jordan's above-mentioned EMV and Digital Transformation Strategy (GoJ 2022, MoDEE 2023). The EMV underlines ICT and digital economy as a core future service, with extraordinary high added value (93% above average GDP per employee, GoJ 2022:57) and growing employment opportunities. Indeed, sector growth rates are stunning. During the Covid-19 pandemic, overall economic activity slowed, but as businesses worldwide needed to switch to online operations, also Jordan's ICT sector experienced a boom, growing by an estimated 6% per annum (Cativiela 2023:22). Int@j and GIZ (2023:2, 7) put the sector's Compound Annual Growth Rate (CAGR) at even 11.64% and the sector's employment growth rate at 31.3% over last three years.

In absolute numbers, Jordan's ICT sector employs about 28,000 persons (DOS 2022a, see figure 1) and there are "over 2,000 active ICT companies in Jordan" (Int@j & GIZ 2023:7). In the EMV, ICT employment still stood a bit lower at 24,700 employees, which constituted 1.6% of total employment but contributed 3% (about 0.9 billion JOD) to total GDP, generating 1.9% of total exports (GoJ 2022:57). The Ministry of Digital Economy and Entrepreneurship (MoDEE 2023) expects that the ICT sector creates 50.000 direct jobs between 2021 and 2025, and that the digital economy has, on top of that, a sizeable impact on job creation in related sectors (MoDEE 2023:6). Put into perspective, ICT employment contributes a significant share of the each year 100-120,000 new positions required – but rarely met – in order to absorb Jordanian labour market entrants (ETF 2023).

Interviewees and reports pointed to a comparative edge of Jordan's ICT sector, grounded in several factors: a fully functional digital infrastructure, a skilled workforce, good access to particularly the Gulf market and an investor-friendly regulatory framework. The sector thus largely meets the challenges to creating a digital economy as set out in section 2.1.

- First, Jordan's digital infrastructure is good, due to a quick roll-out of mobile broadband access especially after 2010, reaching about 60% of the population in 2016 (Viollaz & Winkler 2021). By 2022, 91.6% of the population over 15 years used the internet (DOS 2022b: Table 2.2). 4G internet is widespread and 5G coverage quickly expanding (intaj & GIZ 2023:11).
- Second, interviewees stressed that Jordan possesses an internationally competitive talent pool. Decisive is the combination of advanced digital and technical skills coupled with language skills in English and Arabic – the latter a unique selling proposition for Gulf customers. However, the expansion of digital skills tends to be skewed by social class and might slow, since high-achieving private schools emphasising digitalization cluster in the capital (IV212). The EMV has also identified this bottleneck in digital skills build-up, calling the school system to adapt its education and training to technological innovations (GoJ 2022:56f). For the time being, Jordan ICT workers can compete in common applications but do not have the skills to drive technological innovations: "[For] AI, or machine learning we're talking about math as the base for that, [...] and the demand is not there. To be honest, the demand is in the basic technology skills, if I may say, like Java or dotnet." (IV212). Interviewees were divided how much comparative edge basic digital skills provide.

  > Tech skills is not anymore a luxury, it is a necessity. These are the basic skills required. So, I consider them soft skills, just like any other soft skill there is. These are basic employability requirements [...] just like English command or any other type of skills required. (IV209).
- Third, Jordan has a location advantage, as it is comparatively near to EU und Gulf customers and set in a similar time zone – which is, for digital services, more important than geographical

proximity. These two regions are also the two most important digital service export markets, with a comparative advantage in terms of providing rather high-quality services for reasonable costs (EU) and language proficiency in Arabic (Gulf).

- Forth, Jordan's government provides much official backing and support to the sector (Intaj & GIZ 2023:9-10). The level of ownership and support became, for instance, clear from the renaming of the Ministry of ICT into Ministry of Digital Economy and Entrepreneurship (MoDEE) in 2019, with concomitant enlargement of its mission. Furthermore, Jordan's Information and Communications Technology Association Int@j, already founded in 2000, works closely with the parliament and other legislative bodies, lobbying for better investment conditions in the ICT sector. Int@j helped to shape "[…] the cybersecurity law and the data privacy law. […] And previously, approximately ten years ago, we worked on the ICT incentive laws whereby we were able to reduce the sales tax, the custom tax, the income tax to near zero for any activity that's exporting." (IV209) The EMV refers to "a motivating legislative framework that provides tax incentives" but at the same time admits that some regulations, especially labour regulations, still need to be adapted to the DDE (GoJ 2022:56-57).

Notwithstanding these rather positive preconditions, Jordan's ICT sector needs to assert itself in strong global and regional competition. Internationally, there are known big players like India and Eastern European competitors like Bulgaria, Poland, or Romania (e.g. Arcadia 2023:74), but also African newcomers like Kenya or Rwanda (e.g. Melia 2024). Within MENA, Egypt and Morocco are particularly strong competitors (Selwaness et al 2023), working for lower wages.[10] Still, despite being a much smaller economy than for instance Egypt, Jordan has some advantages especially in terms of skilled ICT personnel.[11] Former MoDEE Mothanna Gharaibeh identifies for Jordan "a unique strength in ICT […with] potential to outcompete regional neighbors" with services of "Eastern European quality at close to India costs" (Cativiela 2023:22). While wages in Jordan's ICT sector are high in regional comparison they are rather low internationally, sometimes causing problems for job retention: "The starting salary for a Java developer or a Python developer is 1200 JOD [...] They work for six months and they go to Amazon for 2000. So the demand is huge and the supply is limited." (IV212)

Jordan's ICT sector first and foremost seeks to serve international customers, and the focal point is Business Process Outsourcing (BPO) and IT-Outsourcing (ITO; intaj & GIZ 2023; Randolph et al 2022). BPO and ITO grew since the pandemic spurred a higher awareness of the possibility of outsourcing online work tasks, and international "companies accept[ed] having their developers in Jordan" (IV212).

Jordan has, for instance, drawn investments by some big international companies, like CISCO, which already in 2011 invested large sums of ICT venture capital into Jordan and Egypt (MEED 2011) and now operates call centres with mostly female operators (IV219). Meanwhile, the emphasis is on ITO, because of higher potential earnings and, presumably, also because of lower risk of automation in the foreseeable future.

> The focus was on both [business process and IT outsourcing] with more focus on IT because this is where the quality of jobs are. There are higher salaries. BPO is more of, you know, just the call centre thing. And of course, there are higher jobs in the BPO such as finance, HR, etc. But [MoDEE is] trying to focus on the ITO. So, mainly programmers and developers, product managers, etc. (IV212)

[10] Another regional competitor are or were (before the widespread destruction of infrastructure due to the Israeli military intervention since 2023) Gazan online workers, mostly working for Gulf customers (IV 221).

[11] Considering Jordan's small country size, 28,000 ICT employees (DoS 2022a) and 1.6% of total employment (GoJ 2022:57) are significant compared to 85,000 Egyptian ICT employees constituting 0.32% of total export-focused employment in 2020 (Selwaness et al 2023:7).

The focus on international competitiveness even led the responsible ministry, MoDEE, to give rather unusual advice to digital start-ups, which is probably at odds with other Jordanian ministries' priorities:

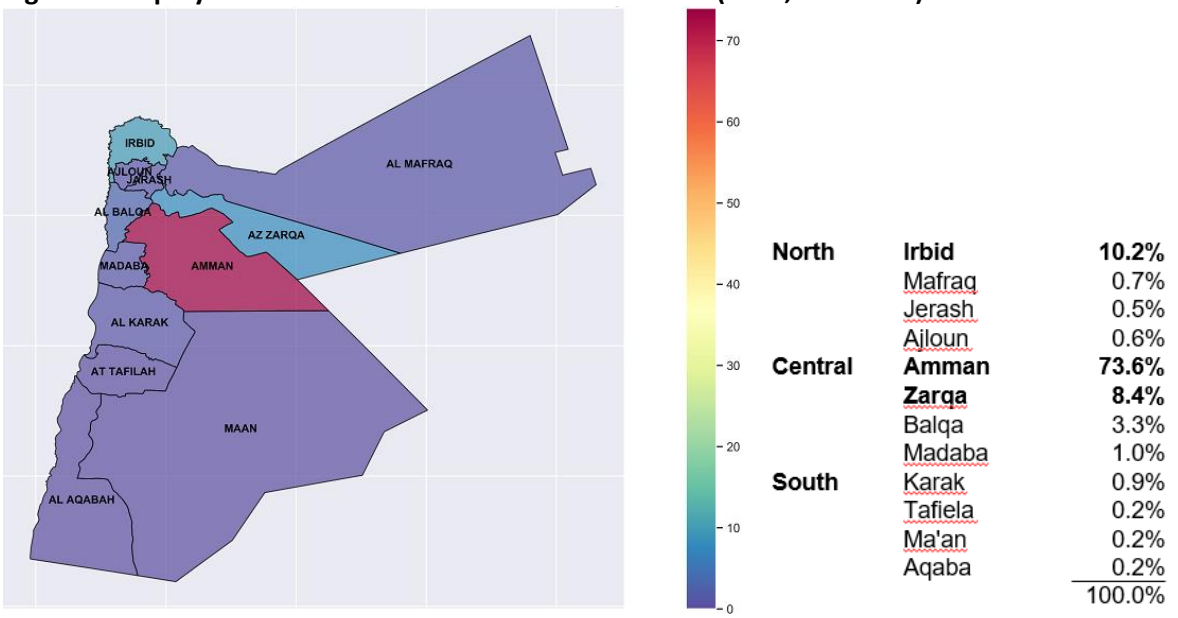
> For MoDEE, it is more important that a company is growth-orientated. That's why they recommend not registering in Jordan, but outside, in Delaware or Ireland. Because Impact Investors or these venture capitalists, for example, don't invest in Jordanian start-ups. (IV198)

Yet, some interviewees lamented that Jordan has not sufficiently concentrated on a particular ICT sub-sector. "None of the decision makers were convinced of this idea because you need to make a decision at the end of the day" so Jordan has not made its mark by specializing, "mak[ing] Jordan the go-to-country when you think of gaming, for example, or you when you think of AI [...] or cybersecurity, for example. But these technologies [...] require preparation from the school level." (IV212).

Like Jordan's overall economic activity and its high-achieving educational institutions, the ICT sector is highly concentrated geographically. A stunning three quarters of employees in the ICT sector work in Amman governorate (74%), followed by Irbid (10%), Zarqa (8%) and Balqa (3%)[12] (see Figure 1, based on DoS 2022a). This clustering is not surprising since Jordan is a highly centralized economy and also because of the location of Special Economic Zones with easier regulatory environments and taxes incentives, like the King Hussein Business Park (KHBP) in Amman or the Development Zone for smart city, IT and medical industries in Irbid/Ramtha (ACC 2020). However, despite Aqaba Special Economic Zone (ASEZ) and the fact that Aqaba is an important hub for undersee cables (Intaj & GIZ 2023), Aqaba has only a negligible share of DDE employment (see Figure 1). The concentration of ICT employment thus persists though internet connectivity, including 4G and 5G broadband speed, is well-developed throughout the country. As one interviewee pointed out, focusing job creation efforts predominantly onto Amman might be a good strategy because the majority of Jordanians live there. In that view, job creation in the other governorates might not serve economic but political reasons (IV219).

The hope that digital infrastructure will expand employment opportunities to rural regions seems to lag behind, at least regarding the ICT sector proper but also in digitally-enabled economic activities we turn to next.

Figure 1: Employees in the ICT Sector across Governorates (2022, N=28.374)



North	**Irbid**	**10.2%**
	Mafraq	0.7%
	Jerash	0.5%
	Ajloun	0.6%
Central	**Amman**	**73.6%**
	Zarqa	**8.4%**
	Balqa	3.3%
	Madaba	1.0%
South	Karak	0.9%
	Tafiela	0.2%
	Ma'an	0.2%
	Aqaba	0.2%
		100.0%

Source: Own calculations and illustration, based on Department of Statistics (DoS 2022a), Jordan.

[12] As a caveat, since employee shares in a majority of governorates are very low (<1%), they might well rely on individual ITC companies.

(ii) Digitally-brokered platform work

It is difficult to find reliable statistics on Jordanian gig workers, as their employment is mostly informal and temporary. Estimations by the Online Labour Index (OLI) point to around 11,300 platform workers, which constitutes only a small share (2.2%) of MENA's platform worker supply in comparison to Egypt (45%), Morocco (11%) or UAE (10%), and only about a 0.08% share of global platform work activity (ERF 2023:7, ILO 2023:14, both based on Online Labour Index by kässi et al 2019). As OLI looks at a mix of English-, Spanish- and Russian-language platforms, these figures might however underreport platform work in Jordan (ILO 2023:14), so alternative estimates speak of 15-20,000 platform workers (ERF 2023:8). Interviewee suggested that overall numbers are low as Jordanians prefer – and can afford to wait for – formal wage employment: "It's not that big. It's growing, definitely. But I don't think it's growing at a fast pace because… I think it's a cultural issue" (IV212), "It's all on you. You don't have a status" (IV221).

As seen in section 3.1 (i), digital infrastructure and skills are in comparatively good shape in Jordan, yet platform workers need to shoulder investments, skills trainings and costs by themselves. For instance, platform workers face the additional financial burden to buy their own equipment and software (ILO 2023:30, see section 3.2 iv). Payment of services, complaints and legal actions are difficult, so platform workers face a high risk of exploitation (ILO 2023:32). In particular, online payment is an obstacle for many "you need to have a wallet and to link it to the bank. So, this is also something expensive." (IV207, similarly IV215II). Legal and administrative are particularly high for platform workers who work for international clients.[13]

A majority of Jordanian platform workers (ETF 2023:9 / ILO (2023:15) fulfil work tasks in high- to mid-skill fields, such as software development and technology (24%/47%), creative and multimedia (43%/16%), or writing and translation (15%/20%) rather than clerical tasks. Yet, also facing global competition, unlike the formal ICT sector platform workers are not supported by the authorities in sustaining their competitive position. An ETF analysis (2023:9) of three online platforms shows that many users open an account but are not active users, concluding that a majority finds itself unable to compete and secure work tasks.

> You need special talents because when it comes to gig, you are competing with the whole world. Unless you have a very unique talent or a competitive advantage, such as Arabic language. Other than that, for example, if I want to build a website or a mobile application […by] a freelancer, why would I come to Jordan? While I can hire someone from India who is much cheaper, or Ukraine, for example, or Poland. (IV212)

Competition is also hard because motivations for searching work on an online platform differ – for some platform workers it is their sole, for others a supplementary income, for some just an occasional job. As one interviewee put it, "Arab Americans […] do this as a game. It's rewarding, it's a plus" (IV221). However, for most online workers in Jordan it constitutes an (additional) source of income – like for 78% of respondents in ILO's (2023:19) sample – especially since moonlighting is common practice.

Online platforms and platform work are very difficult to oversee and to regulate. There is no specific law regulating their operations (ILO 2023:15, Tamkeen 2018:16-18). One interviewee comments that a lot of platforms are unlicensed and many common practices go against the local labour laws, for instance regarding work duration or night shifts (IV215II); workers are not entitled to vacations and off-days (Tamkeen 2018:30). Overall, there are very few regulations for gig work in Jordan, and if so, mostly for place-based tasks such as the ride-hailing business – especially since the competing taxi

[13] A majority of Jordanian platform workers works for Jordanian clients, but a high share also for international customers (ILO 2023:31).

sector pushed for them (e.g. Zintl 2021, IV215II). Fairwork and Phenix (2023:21) published a first rating of ride-hailing and delivery platforms in Jordan, finding that all of the eight screened platforms received zero out of ten scores in the five categories fair pay, conditions, contracts, management practices and workers' representation.

However, the lack of regulations also constitutes an advantage for many online workers, e.g. those who need to balance a daytime with a night-time job, or who wish to stay informal for various reasons (like non-Syrian refugees who might lose their refugee status ETF 2023:6). A lot of online workers simply do not care, since they use it to supplement their income and in parallel recieve "social security benefits […] from the "traditional economy" (through their own full-time employment, or that of a family member)" (ILO 2023:27). ILO (2023:24) thus warns that the perception of platform work as a supplementary and temporary "short-term solution" might eventually contribute to "the commodification and deregulation of labour".

To consider employment opportunities in fields enabled by, but not fully reliant on, digital tools, we briefly discuss the remaining two options that interviewees regularly referred to, (iii) digitalizing private sector firms in non-ICT fields, and (iv) and digital marketing of products made in home-based businesses (HBB).

(iii) Digitally-enabled private sector

Information on the employment impact of digital tools as a general purpose technology are difficult to attain. A large amount of ICT jobs are created in ICT occupations in other sectors and not in the ICT sector itself. For instance, for Egypt, Selwaness et al (2023:11) calculate that this IT staff in other sectors is the main driving force of ICT employment. In a firm survey of a thousand Jordanian and Egyptian companies each, a higher share of Jordanian firms adopted digital tools in five out of seven categories and faced considerably less obstacles in IT-related infrastructure (power outage, days without internet or online server, Zaki 2023: 8-10). The Jordanian companies were also better staffed with dedicated IT personnel in comparison to Egyptian ones, with the exception of firms engaging the two digital tools less adopted by Jordanian firms (self-built payment websites, smartphones in business, ibid.: 11-13). Furthermore, Jordanian firms show higher e-commerce participation than their Egyptian and Moroccan counterparts, though e-commerce in all three countries are still comparatively weak (Zhu & Luo 2023).

For the net effect of the digital transformation on employment, job losses and job displacement due to automation need to be taken into consideration. Yet, for Jordan, no estimations or studies are available yet. While several articles underline growth potentials through artificial intelligence for the Jordanian banking sector (e.g. Abusalma 2021, Ahmad 2024, Ali et al 2022), energy grids (Shuqair 2023), journalism (Sharadga et al 2024) or through automation in the sweets industry (Alabsi 2023), there are no systematic assessments on the size of job displacement in Jordan. Some manufacturing firms are testing robots in their production processes, but not to a large extent (IV2017).

In terms of the digitalization in existing private sector firms in non-ICT fields, the uptake of digital technology depends on the firms' owners and managers. Individual companies and entrepreneurs are considering the options, but digitalization is costly and needs a lot of resources in order to successfully boost the business:

> Devices may be one of the problems, but also […] some kinds of applications or just having internet or software. For software, it is easier […] a lot of platforms are there, and a lot of marketing agencies are working on this. […] But if we are talking about implementing digitalization to ease the working processes, this is something else. This needs a lot of funding because it's an expensive process. (IV207)

As the same interviewee later elaborates, that the investment into digital marketing and e-commerce is not always cost effective:

> The problem is that e-commerce needs someone who is a professional in content development. […] It's something that's very costly if you want to do it in the right way and to get some benefits out of this. Around 89% of the companies and SMEs in Jordan are small companies and so not everyone can afford it, and it needs someone who is really trained […in] developing the right content that will attract others. It's not something that's easy. (IV207)

This is in line with the available literature, describing businesses' lack of financial means and knowhow (Farley & Langendorf 2024), as well as and very low teleworkability especially in microbusinesses below five employees (AlAzzawi 2023:115).

In addition to the important signalling effect of the above-mentioned government strategies, several Jordanian think tanks and private sector associations engage in awareness raising about the economic importance of digitalizing one's business (e.g. JSF 2023; Phenix Center 2024a, 2024b). Yet, these publications are rather general calls for action. They neither refer to past experiences of digitalizing manufacturing or service companies nor to specific state-funded digital support programmes for Jordanian companies. In line with this, interviewees miss large-scale public support for the private sector's digitalization efforts. "The government nowadays is supporting and funding the industrial sector mainly […] concentrated on exporting. […] So, the funds are not in a direct way supporting digitalization. They are supporting it in an indirect way." (IV207) A notable exception is the Youth Technology and Jobs (YTG) Program run by MoDEE and financed by the World Bank, worth 200 Mio USD. Its three pillars focus on digital reskilling, private sector development, and public sector digital transformation. YTG also aspires to set up Digital Hubs in several governorates as "a combination of a co-working space, an incubator, a training centre, etc." (IV212). A general "subsidized rent for private sector to setup offices in remote areas" as recommended by the engendered strategy of the EMV (Amawi 2023:89), could build on this.

(iv) Digitally-enabled home-based businesses

There are no figures on micro businesses and home-based businesses (HBB) started to operate or expanded due to digital tools. The large majority of them constitute necessity entrepreneurship, and most of them operate informally. Furthermore, there is no official backing, as MoDEE does not perceive them as 'real' enterprises, as they define enterprises as "tech-based, investment-oriented, and growth-oriented" (IV198). Likewise, int@j – the "ICT and IT Enabled Services (ITES) industry advocacy, support and networking association" (int@j & GIZ 2023:23) – sees HBB outside their mandate: defining IT Enabled industries narrowly, it offers services only to those micro-businesses with technology at the core of their business model (IV208).

'Going fully digital', beyond simple social media marketing is not an option for most HBBs. As with other private sector firms, only some owners of home-based businesses take the decision to use digital technologies and interviewees were divided on the advantages of digital technologies for non-tech-based HBB and other micro businesses. Low-threshold social media applications are used to enlarge the range of their usual word-of-mouth marketing strategy (IV212, ARDD 2021). "Older [women use] Facebook younger Tiktok or Instagram" (IV214). Using advanced e-commerce strategies is costly and risky, and, like for online work, invoicing and payments are problematic. Larger scale is e-commerce is neither affordable nor competitive, especially since most Jordanian HBBs offer similar goods and little innovative services (see 3.2 iii). "I mean, e-commerce... if you go to the [rural] governorates and you help a woman who's cooking at her house selling Labaneh [Arabic Yoghourt] or pastries or whatever […] to her neighbours. [...] The market in Jordan is very small. We have to be innovative and target other markets" (IV212).

Most HBB owners choose to stay informal, since formalization entails considerable risks and costs regarding taxation or compliance with health and safety or other[14] regulations (see 3.2), even though there are also benefits, such as access to legal protection, social security or to new customers and markets through formal invoicing (see Lenner & Turner 2024). As social security contributions are calculated assuming full-time work, not a number of hours, so that registering social security for flexible, part-time work has a negative impact on pension entitlement (IV220I).

Like online platform work, HBB are seen as a good supplementary household income and "regardless of their legal status, they do have their market" (IV209), but they have little incentives to grow. Digital technology could help them with that, "[HBB's] challenge is not operational, the challenge is scalability. [...] To scale-up they require two things: continuity and quality. Continuous supply of the same quality of the same product or service. Now tech does help them with that. However it does not tackle the issue of continuity" (IV209).

Digitally-enabled private sector firms (iii) and home-based businesses (iv) more often complained about regulatory weaknesses or a lack of official support. There are only few legal provisions in Jordan regulating e-commerce (Alsharu et al 2024). After years of consultations, policy-makers prefer "not to have a separate law for e-commerce, [but to] enhance the existing laws with a few articles [… like] customs duty, taxes permissions and licenses, in addition to logistics transportation and consumer protection" (IV208). Since regulating cross-border e-commerce is difficult, businesses prefer local e-commerce over the more challenging e-commerce imports and exports (de Melo & Solleder 2022; IV208). Smaller digitally-enabled businesses, especially in rural locations, are not targeted by MoDEE's above-mentioned YTG Program, and there are no rural e-commerce support programmes in place, such as the Rural E-commerce Demonstration Program or the public-private Rural Taobao Program in China, which foster networking, training, as well as logistical and financial support (Zhu & Luo 2023). Furthermore, Jordan's digital employment platform Sajjil would need to be further expanded and redesigned to match private enterprises' needs (GPRG & JSF 2024)[15].

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So far, our analysis has shown that there is a bifurcation between the employment potential of digital vs. digitally-enabled companies. On the one hand, there a growing presence of dedicated ICT companies, which are internationally active and competitive, mostly centrally located and access to a well-trained talent pool. The pool of online workers is growing, too, yet under less privileged conditions and mostly as an occasional job providing supplementary income. On the other hand, private sector companies in other sectors seem to be too much entangled in business as usual to afford the necessary funds and strategic oversight for larger-scale investments into advanced digital technology. It is however certain that these difficulties pertain especially to small and micro businesses, and in particular home-based businesses and online work.

3.2 Does digital(ly enabled) work mitigate barriers to female employment?

> In addition to creating direct jobs [in the ICT sector], the number of jobs provided by digital technologies is massive, as these technologies reduce transaction costs and increase the chances of individuals who face obstacles in finding jobs. They also support the integration of women, residents of remote areas, and people with special needs in the labor market. (MoDEE 2023:6)

[14] HBB face problems registering (i) if the owner of the building is not paying property tax, (ii) if there is not a a percentage of the home dedicated to the home business, or (iii) if, for some kinds of businesses, the neighbours don't agree (IV207).

[15] Sajjil has provided job matching for around 18,000 (2019) and 10,000 (2020) persons, but could better use its potential if, for instance, online registration of vacancies instead of in-person visits was possible (GPRG & JSF 2024:28)

Despite high expectations that digital tools will ease labour market access also for marginalized groups on the labour market, the developments in the DDE economy have not yet been reflected in higher recorded FLFP. Of course, the DDE economy is too small a sector to significant influence overall figures and also statistical effects[16] explain stagnant FLFP. However, as this section shows, the distinct features of the DDE economy have only partially reduced barriers to female labour market inclusion in Jordan.

This section thus discusses to which extent and through which channels the identified barriers to female (wage) employment (section 2.2) have been influenced by the DDE economy. Based on interviewees' opinions and attitudes, the section assesses the specific two enabling and two limiting factors for women economic empowerment, focusing on what sets women working in the DDE economy apart from women in other economic activities:

(i) Flexibility through remote work
(ii) Appropriateness of workplace
(iii) Gender stereotypes and female-dominated sectors
(iv) Digital gender gap and skills mismatches

For each of these factors, the section discusses to which extent Jordan has been able to reap the opportunities and curb the associated risks.

(i) Enabling factor: Flexibility through remote work

The digitalization of work processes offer more flexibility, especially if work tasks can be done through remote work. This factor is the prime reason for hopes that the DDE can boost female employment shares. Teleworkability of jobs has been researched across MENA countries, establishing that working women are more likely than men to be in teleworkable jobs (see section 2.2). Jordan fares comparatively well. For instance, in AlAzzawi's (2023) teleworkability index, constructed to best reflect MENA contexts, Jordanians (29%), and in particular Jordanian women (60%), have the highest likelihood of working remotely compared to Egyptians, Tunisians and Palestinians (only Algerian women have a slightly higher teleworkability; 2023:110).

Teleworkability depends first and foremost on the nature of the work task, and the ICT sector is most reconcilable with remote work, followed by professional services, the public sector and finance (Hatayama et al 2020:16). The share of Jordanian women in teleworkable occupations exceeds 90% in several industries, especially in arts, finance and insurance, construction – presumably the very few women in this sector work overwhelmingly in clerical positions – and ICT (AlAzzawi 2023: 113). Therefore, overall high teleworkability shares for Jordanian working women are also due to the overall sectoral split of the economy, with large employment shares in female-dominated, teleworkable sectors such as education or public administration (ibid.: 111). Yet, interviewees were quick to point out that other female-dominated sectors, such as tourism or the health sector, do not lend themselves easily to remote work.

But also within the ICT sector, as Amawi (2023:85) criticizes, policies may not concentrate enough on generating a supportive environment for women, especially concerning flexible working hours, but also available childcare and transportation, as remote work is not possible everywhere. The potential of ICT is not met, as its main advantage – flexibility – is not leveraged.

[16] Some interviewees pointed out that informal employment might be only partially accounted for in the statistics (e.g. IV 204, 217), others saw it as a big success that FLFP remained at roughly the same level despite women's exiting the labour market during the COVID-19 pandemic and population growth. "[FLFP] remained the same despite all the efforts over the past years […] population grew, the figure also grew but it remained the same pretty much in comparison with the population" (IV 209).

For home-based businesses and online work, remote work is a given, making it an attractive choice for women with alternative time commitments in childcare and household chores. Female Jordanian platform workers earn an income and "retain some connection to [… the labour market and], maintain or grow their skills and generate an income" (ILO 2023:32). Especially for female refugees it provides an attractive work opportunity (Hunt et al 2017). Yet, higher flexibility come at a price in terms of freelance informal work and lower status (see ii below) or, in some cases, in terms of safety (ride-hailing and delivery apps). Gender-disaggregated data for Jordanian online workers are unfortunately not available, neither by the OLI nor a subsequent ILO survey (N=323) within the task fields 'writing and translation' and 'creative and multimedia' (assumed to be the most attractive fields for female platform workers, ILO 2023:15). This survey however showed that Jordanian platform workers tend to be very young (3/4 under 35 years) and educated; their main motivation for doing platform work were, besides additional income (78%), flexible working hours (27%) and remote work (25%, ILO 2023:17,19). For place-based platform work, the share of female drivers on ride-hailing apps is miniscule, but some women drivers are registered on delivery platforms. Yet, as a report by for Fairwork & Phenix (2023) shows, many of them feel unsafe delivering to specific destinations but cannot cancel specific orders without penalty and platform operators have no specific gender-sensitive measures or complaint mechanisms. One, for instance, complained that "morning shift is safer, but the evening shifts from 6 to 12pm are more lucrative" (Fairwork & Phenix 2023:27).

In terms of policies, Jordanian authorities have recognized the need for more flexible working times such as part-time or remote work, and therefore issued the Flexible Work Regulation (Article 22) for private sector workers in March 2017 and a subsequent amendment in the Flexible Work System in June 2024. The Civil Service Flexible Working Hours Regulation of 2018 makes similar arrangements for public sector employees (Roya News 2018). Pregnant women and women with care responsibilities are eligible for increased flexibility.[17] Furthermore, the Flexible Work System of 2024 has cancelled two highly problematic parts of the regulation of 2017, the 3-years-at-the-same-employer requirement and the obligation for periodic employer reports (Roya News 2024; GoJ LOB 2024) and it becomes obligatory for employers to state the reasons[18] for refusing an employee's wish for flexible hours. However, as the Jordanian Labor Watch rightfully notes, workers still need to apply for flexible work which can be simply refused by their employers, without clear legal remedies for appeal, so that the implementation of the law is expected to remain low (Phenix 2024a). Furthermore, the regulation does not include any regulations on hybrid work arrangements, which are "the most common form" but not part of the work contracts, thus leading to confusion whether existing work contracts need to be reissued (JSF 2024:2). Neither are there specifications for justified exceptional situations, like remote work for care-givers in case of child illness (FES & Karak CC 2018:18). One interview also raised concerns that social security of part-time workers is not yet clearly regulated and that regulations forbid women to work after 10pm (IV201).

Implementation is the main problem for this and other recent changes to the labour law – many of which relate to female labour force participation (IV220). Employers are often not aware of the regulation, including the 2018 regulation for civil servants (IV202). Or they are not willing to grant more flexible working hours, or to formalize flexible work arrangements, as the immediate benefits to the employers are slim. Anecdotal evidence suggests that, rather, employers informally let women make up for lost hours due to childcare in the evenings (IV201). Also a small-scale non-representative survey

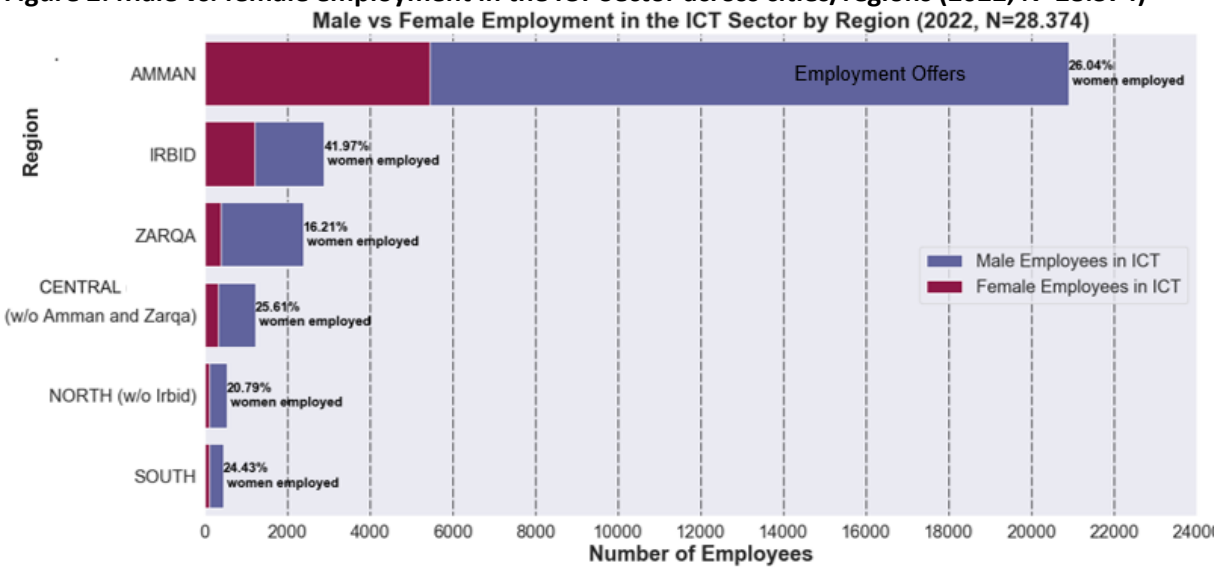
[17] Flexible or remote work is also available for all civil servants who have completed their probationary period, are within the probationary period but pregnant or with care responsibilities for family members, and are not working in shifts or in managerial positions (Roya News 2018).

[18] The JSF (2024:6) unsuccessfully contested this clause in the draft regulation since it "restrict[s] the employer's powers".

and focus group discussion by FES & Karak Castle Center (2018) indicated these shortcomings in the flexible work arrangement. A household survey in three MENA countries during the Covid-19 pandemic revealed that Jordanians more often than Egyptians and Tunisians could not work from home because they were "not allowed", rather than for reasons of lacking digital infrastructure (AlAzzawi 2023:120).

The potential of remote work for rural job seekers has been a recurring theme in many interviews, yet as one that has not yet been sufficiently reaped. As observed (Figure 1 above), Jordan's ICT sector clusters in few (sub-)urban governorates, but also the share of female ICT employees, nationally at 24,8%,[19] differs considerably between governorates. While Zarqa has, after Amman and Irbid, the third highest share of total ICT employment, it has one of the lowest shares of female ICT employees (16%). Irbid governorate, on the other hand, has a very strong female share (42% of ICT employees, see Figure 2). Parts of the difference might be explained by the predominance of specific ICT occupation (e.g. call center operator) in a given region and be skewed toward the workforce in a few large companies. Yet, interviewees also pointed to more restrictive social norms in some neighbourhoods. For instance, Zarqa and East Amman are very traditional areas with low digital inclusion of women (IV215).

Figure 2: Male vs. female employment in the ICT Sector across cities/regions (2022, N=28.374)



Source: Own calculations and illustration, based on DOS 2022a.

Furthermore, the share of unmarried women in the recorded ICT workforce – who are usually less dependent on flexible work arrangements as they have less household and care work responsibilities – is relatively large (similarly, Selwaness et al 2023, for Egypt). While Jordanian single and married men are almost equally represented (36% vs. 38%), more single than married women work in the ICT sector (20% vs. 6%, DOS 2022a). Overall, remote work arrangements seem not to be a strong enabling factor for workforce participation of female employees in the digital economy. Female ICT employees in Irbid *and* Zarqa are predominantly single[20] and, again, this is presumably linked to lower-skill work tasks, such as call-centres.

Teleworkability is one factor enabling female employment, but certainly the whole package of working conditions plays a role. Women in office jobs – whether working remotely or not – stay longer in their jobs which, as some interviewees emphasised, adds to their long-term employment and career

[19] Based on DOS 2022a, own calculations. Figures are somewhat contradictory, between 33 per cent female participation in the ICT sector (Amawi 2023:81, citing Intaj 2018) and 24 per cent in 2018 rising to 34 per cent in 2021 (ibid.:82, citing DOS).

[20] in Irbid, 37% of all ICT employees are single women and only 5% married women; in Zarqa, all 16% female ICT workers are unmarried (DOS, 2022a)

development. Reportedly, in the digital economy, job retention rates are higher for women than for men, who tend to leave for better-paying opportunities in other companies or abroad. Women's reservation wages are lower since working conditions play a higher role for them: "[Women] are more committed to the same company than men. So a man would, for example, leave the company for a 10% increase. A woman if she's happy with the environment, she wouldn't leave." (IV212)

(ii) Enabling factor: Appropriateness of work

A respectable and reputable job plays a big role for women in Jordan, as shown by the literature on female preferences for and overrepresentation in public sector office jobs,[21] also due to better chances on the marriage market (e.g. Krafft & Assaad 2020). Even more than in many other country contexts, Jordanian women are attracted to jobs in the service sector and especially to white-collar occupations (Bandiera et al 2022).The digital economy is, by definition, a modern and innovative sector, taking up cutting-edge technologies. Jordan's engendered strategy fosters the expectation that the sector provides "many prestigious jobs with good income" for women (Amawi 2023:76, translated). Working in the DDE economy is thus connected to a modern image and a respectable white-collar job. This holds true for male and female workforce, even in sectors where the actual tasks do not require particular skills or qualifications.[22]

Especially the 'ICT sector proper' is perceived as a modern sector, with a formal status and mostly good working conditions. IT jobs do not involve physically demanding or dangerous work tasks, so the field in general is considered as a safe and socially acceptable choice for women. One interviewee called it "the most refined sector in Jordan. [...] the companies, they have nice offices, they pay well, [and have] proper management. The women and their families, their parents, won't mind their daughters working in a ICT company versus working in a factory, for example, or in a hotel" (IV212).

The ICT sector is attractive for a range of women: The prospect of an office job in line with social norms and gendered expectations draws women from more traditional backgrounds while the modern image of DDE jobs as well as not-yet entrenched management levels and practices also attracts "less traditional" women, more independent of traditional norms. Due to decreasing job opportunities in the public sector as an employer of choice for women (e.g. Assaad 2014; Klasen 2019), office jobs in the DDE economy may fill this void for workplaces particularly suitable for women. Similarly, Selwaness et al (2023:12) show that good working conditions in Egypt's DDE economy provide "a source of expanding opportunities for women in Egypt in an otherwise inhospitable labour market", yet they also identify downward pressures on the working conditions in ICT (e.g. falling social insurance cover for women in the sector) and lower attractiveness for married women (2023:17,29,31).

Also online work and digitally-enabled work in HBB are considered socially appropriate for women, as they do not even have to leave their house or interact face-to-face with customers. However, there is little reputational gain for women working in these fields. Both, HBBs – whether using digital tools or not – and online work are mostly informal freelance (or pseudo-freelance) work. "It's a cultural issue. People would like, you know, stability and security. And with gig, you don't have that" (IV212).

[21] Over 90 per cent of working women with secondary education seek white-collar wage employment, concentrated in health, education and public administration (Klasen et al. 2021)

[22] For instance, for mostly male drivers registered on ride-hailing platforms (Zintl 2022).

(iii) Limiting factor: Gender stereotypes and female-dominated sectors

Despite the reputational gains (ii) in the ICT sector, gendered stereotypes in 'appropriate' economic activities tend to persist. Whether a job is considered 'appropriate' for women or not depends on the exact circumstances, and employer perceptions.

The literature and interviewees revealed that there still are employers' preferences or prejudices, and often also women's own preferences reflect gender stereotypes. A survey conducted by the National Center for Human Resources Development (NCHRD cited in Amawi 2023:84) found that in their sample of private ICT sector firms an overwhelming majority (94 per cent) stated they would not consider hiring women – mostly (88 per cent) because they are active in wholesale and retail, requiring face-to-face customer contact. Arguably, best employment opportunities for women lie in back office operations.[23] As another factor, there also might be a certain path dependency for ICT as a male-dominated field, particularly in smaller companies: "Tech companies in Jordan – and I'm not sure if it's the same somewhere else in the world – started with two people, a developer and his friend. [...] Then it will grow to 6 or 7 people and they are all males. And suddenly, you know, the office is not really attractive for females, so there are none." (IV208).

However, interviewees opined that employer discrimination and prejudices in the ICT sector are comparatively low. "Tech companies are just after the skill and not the person. They don't care if it's a male or a female. If you're skilled and you can do the job they're interested to hire" (IV208); there is a 30% female representation at the start-up scene (ibid.). Gender stereotypes and female reservations about technical fields seem to be less influential than in many other, e.g. Western, countries where women are often under-represented in critical sectors such as ICT (Pappas et al 2017).

Still, women's own preferences and self-selection into less technical fields play a crucial role. While there is a high female share of women amongst ICT graduates (see iv), this does not necessarily mean that they will work in that field, or work at all. Amawi (2023:84, translated) points to the fact that "a greater number of [these] women work in the sectors of finance, insurance, scientific and technical services." An interviewee explains:

> Regarding enrolling at the scientific courses in the universities, the number of women is so high and they excel actually up on it. But unfortunately, when they go to work, most of them pick the jobs that are easier for them. She's an engineer, she works at a school as a teacher. She's a pharmacist, she a chemistry teacher. This is one of the challenges that we have. We have a large number of women in the scientific faculties and courses. But when it comes to the work, they tend to go to something easier because of the burdens that they have at home. (IV207)

In this way, women often just get a job but do not necessarily invest in making a career. "Many [female] tech graduates are just going to [administrative] jobs, which is not good for them because, you know, you're not really getting the best out of them" (IV208).

Gender stereotypes tend to be strong in the HBB field. Markedly, most women-led HBBs operate in only a few business fields like food-processing, handicrafts or cosmetics (IV215II), thus offering little innovative goods and services. Several interviewees pointed out that replicating the same business model leads to lower competitiveness, as businesses face an "oversaturated market" (IV201) as there is low demand for similar foods and handicrafts. Digital tools help HBB to expand their market from

[23] Amawi (2023:84, translated) sees best opportunities "for females to work as ICT sales specialists, advertising and marketing specialists, telephone exchange operators, programmers, database designers and programmers, electrical engineers, salesmen, and communications engineers, with approximately 4,973 job opportunities for the years 2017-2019."

the neighbourhood to urban and international customers, including tourists and expats (e.g. IV219), yet sales figures are strongly impacted by fluctuations in the tourism sectors (e.g. due to COVID-19 or conflicts in neighbouring countries). In this sense, the business model as such, seems promising, but not the current choice of product.

Several interviewees criticized that policy-makers and donors push HBBs to formalize their business, despite possible negative effects also and particularly for female owners (e.g. IV214). Registering their business has ambiguous effects: while they can join social security schemes with benefits such as maternity leave, especially female owners fear that, once they register their micro enterprises, they will face stricter regulations, e.g. for health and safety (IV203), and need to pay taxes. Interviewees referred to manifold examples where female HBB owners fear they cannot compete on the market, unless they save these additional costs: "She is competing with the shop that is doing the same kind of pastries [… and thinks:] 'I'm not in the Social Security, I don't have these expenses that he has. But if I did, I couldn't compete with him'" (IV207).

Women owners of micro businesses are often not confident that they will be able to spend enough time on their business in future, for instance because of their caring responsibilities, so they do not formalize their HBB or expand it using digital tools. If, for instance, a child becomes ill, closing a business again can prove to be a difficult, expensive and lengthy process. Especially if they have taken out a grant, they are "stuck in that situation" (IV212). Failing to pay down a loan may make women more vulnerable, instead of empowering them. In Jordan, the debt trap has serious consequences, including imprisonment of women (IV201, ARDD 2019). Some interviewees call for tax waivers to curb the risks "for 4-6 years after formalisation" (IV217), and recent legislation stipulates that no legal action can be taken against debtors who cannot repay very small loans below 5,000 JOD (IV203).

On the other hand, there is also a risk that digital marketing is too successful; for instance, if women-led HBBs receive too many orders via Facebook at the same time and cannot process them (IV195). Literature suggests that cooperatives would be a better approach to pool resources and risks (Lenner & Turner 2024; Olmsted & Killian 2020: 29-30) and digital formats would be a good way to run them. Yet, so far existing digital platforms are run for-profit by companies, not by cooperatives (IV195).

Against this background, donor support for HBB was by several interviewees seen in a critical light, because funding conditionalities and little innovative business models can lead to dependence.

> With the donors, it's a number game at the end of the day. […] Ticking the box that we have trained a thousand women, now they have a thousand shops online or Instagram pages. We take the photo, we write the press release and that's it. What happens after that? […] You train them, you open their shops and you leave them. Sometimes you ask them in order to give them the grant to register a company. And this is a disaster because you can register a company in Jordan in one or two days. But closing it, it will require a year. (IV212)

Yet also on the side of the donor agencies "regulations, costs, paperwork" are high, which renders projects less impactful (IV221).

Some interviewees doubt that the Jordanian state's emphasis on gender issues is born out of a genuine support for gender equity or rather a part of a pro-donor visibility campaign and rent-seeking effort to prop up the government budget: "The government is trying to get more money. [...] They would do anything, so they also accept the gender mainstreaming in their programs and in their strategies" (IV214). Sander (2023) warns that donors' well-intentioned support for women NGOs may have detrimental effects and contribute to shrinking public spaces by taking away the agency and room for manoeuvre from local feminist initiatives. One female interviewee complains that donor-driven feminism is just "whitewashing" and "labelling, taking away the meaning of the word itself" (IV215I). Projects combining support for women economic empowerment with digital technology draw donors' support in more than one way and thus can contribute to a modern image of the state. In that sense

the above-mentioned reputational gain does not only benefit the women and women employment, but also serves authorities' funding requirements. Donors need to be aware of this motivation and should re-focus their initiatives in a way that nudges toward more genuine gender-sensitive politics and reaps the benefits of digital tools to mitigating barriers to women employment.

(iv) Limiting factor: Digital gender gap and skills mismatches

Reskilling and narrowing the digital gender gap is one of the most discussed bottlenecks of digital structural change globally, and also of central importance for (female) job creation in the DDE. Also in Jordan, "investment in digital inclusion is [considered to be] a multiplier" for FLFP (Amawi 2023:76, translated). Yet, there is no digital gender gap in Jordan in the classical sense and interviewees describe it as "less relevant in Jordan" (IV219); rather labour demand remains the decisive bottleneck. As this subsection shows, not only does Jordan enjoy a quite high share of female STEM graduates, women's access to internet connectivity and, thus, the digital gender gap is comparatively narrow. Skill mismatches thus require a detailed and forward-looking diagnosis.

Accessibility: In the late 2010s, the digital gender gap in internet usage stood at about 9 % (43.8% of women and girls compared to 52.8% of men and boys), the gap in computer usage was even smaller at 2.7 per cent (22.9 vs 25.6 per cent) (Amawi 2023: 77, based on DOS 2015-17). By 2022 – after the Covid-19 pandemic – the digital gender gap further diminished. Across all educational levels the gap in internet usage shrunk to 3.3 per cent (90.0% women over 15 years vs. 93.3% men) (DOS 2022b: Table 2.2).

Educated and economically active women in Jordan are more likely to use the internet than their male counterparts. For instance, in 2017, 96.7 percent of women holding at least a Bachelor's degree (vs. 94.7% of men) and 88.5 percent of women with an intermediate diploma (vs. 85.5% of men) used the internet.[24] Economically active Jordanian women, whether they are gainfully employed (94.7% of women vs. 88.9% of men) or recorded unemployed (96.4% of women vs. 84.8% of men) tend to use the internet more than men (Amawi 2023:79, based on DOS 2015-17). Solely at the intersection of rural population with less than secondary education, the gender gap in internet usage is with 13.4 percentage points still considerable (74.7% of women vs. 88.1% of men, DOS 2022b: Table 2.2).

These figures show that very basic digital skills are widespread. "Tech skills are not anymore a luxury, they are a necessity. These are the basic skills required. So, I consider them soft skills, just like any other soft skill there is" (IV209). Yet, only a share of these basic skills are honed toward employability. DoS data of 2015-18 show that 63.2% of women used computers for education and training, 55.8% for entertainment, and 30% for work (cited in Amawi 2023:78). The most used internet services cited by women were social media (94.9%), multimedia (80.2%) and gaming (55%), only a third uses e-mail services (ibid:79).

Respondents also shared concerns about the future skills development, criticising curricula had too little focus on computer sciences and quality of education was deteriorating, especially of public schools. "What created Jordan's reputation 20 years ago our education system was our people. Today, our education system is getting worse" (IV212).

ICT education: On the upper end of the skills ladder, Jordan has a high number of female ICT graduates. In global comparison, a high share of Jordanian women is educated at secondary and tertiary levels (WEF 2023), and this also extents to female ICT and other STEM graduates. In 2018, 51% of ICT graduates were female, yet while two out of five graduates of both genders joined the labour market

[24] By 2022, the share of internet users went up to 99.1% (holders of Bachelor degree and above of both genders) and 98.9% (women holding an intermediate diploma vs. 94.7% of men) (Dos 2022:Table 2.2).

the same year, only 36% of these were women (MoDEE cited in Amawi 2023:84). Other estimations on the female share amongst ICT graduates are lower, at around 40-44% for "around 7000 ICT related graduates per year from the universities and colleges" (IV208) or at 43% at bachelor's and master's level for around 4300 university graduates in ICT of the 2019-20 batch (Amawi 2023:76-77).

In any case, there are mixed assessments on the quality of education. Some universities have a good reputation and offer relatively advanced degrees, such as Princess Sumaya University for Technology and Hussein Technical University (e.g. IV204). These and other specialized institutions are mostly in the capital and offer places to best-achieving graduates of private schools, so there are severe social and geographic access issues (IV212, Pascucci 2019). Structural inequalities persist in terms of income, education and opportunities related to class and geographic location (Amawi 2023:76, figures).

On the other hand, informal platform workers experience difficulties as they cannot 'prove' newly acquired digital skills. As long as platform providers do not issue digital skill certificates (Kässi and Lehdonvirta 2019), online workers cannot successfully apply for formal (wage) employment.

Putting skills to use: Not all technical skills are immediately marketable and need to be honed to stay up-to-date. "The problem is that skills, especially in STEM [fields], you also need to upgrade them to the new trends and new technologies (IV207). ICT skill trainings for women and other active labour market policies are at the centre of several programmes, such as the above-named YTG programme, which invests into the upskilling and reskilling of normal STEM graduates (IV220), or the "Madad" EU Trust Fund (e.g. IV221). Yet, such IT trainings do not necessarily translate into actual employment in the ICT sector proper due to other constraints. Pascucci (2019) details this for a „coding boot camp", especially for female participants who are marginalized also by their refugee status or bound by traditional norms or personal responsibilities.

Also in non-ICT but digitally-enabled sectors, there is much need for specialized digital skills but often no funding for dedicated IT personnel. The lack of digital skills is, not surprisingly, most pronounced in relation to HBB, which almost by definition are one-(wo)man micro-businesses. Thus, skills trainings which emphasise women's economic empowerment and entrepreneurship promotion, in particular for home-based businesses led by refugee women and rural women, are consequential and much needed. "While, for example, half of Jordanian and Syrian women are estimated to possess handicraft skills, they lack the digital and marketing skills to turn their abilities into income-generating businesses by targeting potential buyers online." (ETF 2021:36). Yet, as seen above, there are also larger, more structural problems, in addition to a lack of e-marketing and other technical and business skills (e.g. Phenix 2023:41). "[These women] don't know how to market their products. They don't know how to calculate their costs, they don't know when and how to register, how to protect their brand. […] It's about awareness, financial literacy" (IV207).

Furthermore, the digital gender gap in rural areas is not only a skills gap but also an infrastructure gap. While mobile broadband access is, as outlined, not an issue, most people have only access to mobile phones. Digital devices required for more specialized digital tasks, "especially graphic-heavy, high-tech tasks such as video editing, animation and photography" (ILO 2023:22), are lacking:

> If you want to give more opportunities to more females outside Amman and maybe in disadvantaged communities, [one point] is the infrastructure. […] The big companies, they would give you a laptop. But if you want to work as a freelancer or an ITO or BPO person, you will need a laptop. [...If] I do have [internet] access on my phone I can't work. I can't design on my phone, I can't develop on my phone. […] We have 99% access to internet across Jordan [but] we don't want fun access. We want access to work opportunities. (IV212)

Likewise, AlAzzawi's (2023:119) data show that only a fraction (7%) of Jordanians working in theoretically teleworkable jobs actually have access to a computer with internet connection (while overall 15% of the population have such an access, but not necessarily a teleworkable job).

To summarize the subsection on the digital skills gap, internet connectivity and basic IT skills are no decisive binding constraint to female employment in general, but for rural women with little education. Digital skills are a necessary but not a sufficient conditions for better employment opportunities. Still, the interplay with labour demand for specific (technical) skills and with women's other labour market barriers as well as poor access to ICT devices result in a constraint.

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In summary, the advantages arising for women in the digital and in the digitally-enabled economy are highly different (see Table 2), especially since the discussed digital enablers and limitations seem to be more problematic for women marginalized also by other characteristics. Initiatives for home-based businesses led by female refugees or rural women cannot address structural inequalities (such as quality of employment) and work within existing female labour market barriers, but do not try to change them. The strongest factor for female employment in the DDE are reputational gains in white-collar jobs. Yet, even under best circumstances, "ITC, finance, banking, and 'good' online work will not create enough employment" (IV221).

Table 2: Digital and digitally enabled economy (DDE) and barriers to female employment in Jordan

Barrier to FLFP / **DDE segment** - characteristics	**Flexibility (remote work, flexible hours)**	**Appropriateness of workplace and task**	**Gender stereotypes (female-dominated sector)**	**Digital gender gap and skills mismatches**
ICT sector (digital, formal) - Official backing - Mostly urban - Service export with rising competitiveness	More common than in other sectors	White collar office job - meets social norms - high reputation	New field without inherent stereotypes	Rather low, but depending on specialization
Digitally-enabled Private sector - No large-scale support for digi. - Diverse, market and competition depends on sector	Seemingly little access despite new gender-responsive labour laws (e.g. flexible work arrangement)	Depends on sector	Depends on sector	Depends on specific sector and occupation; often lack of funding for digitally skilled personnel (but better than e.g. in Egypt, Zaki 2023)
	More data needed			
Digitally-enabled home-based bus. - No official, but donor backing - Mostly rural - Mostly domestic market	Yes, flexible by definition. But high double burden, as no access to gender-responsive labour laws.	Gender-sensitive by default. Digitalization does not boost appropriateness.	Digitalization does not change gender stereotypes in business models (> lead to high competition)	Digital gender gap exists for less educated rural women. Less digi skills needed but also bound by very basic skills (e.g. social media)

Online work - No/little official backing - Very diverse: • domestic freelancers • service export subject to high competition	Yes, flexible by definition. But high double burden, as no access to gender-responsive labour laws.	Gender-sensitive by default. Danger of cyber-crime.	More data needed	Supposedly pool for ICT graduates w/o formal employment. More data needed.

Source: Author's compilation.

4 Conclusion and policy recommendations

Despite the relative successful development of Jordan into a stronger "hub" for ITC-related services and a relatively strong female workforce contributing to this sector, the impact on Jordan's labour market and female employment remains rather slim. While Jordan is proud that women's share in employment in the ICT sector is high, it seems to foster women in the DDE only as a by-product of its supportive policies toward ICT, and in particular ITO / BPO. The strategy is so far one of excellence and lighthouse projects, not a real nation-wide structural change reflected by a labour market accessible for broader parts of society.

There are no particular gender-sensitive policies that connect to the DDE economy. So far, the approach seems not to be linked to broader roll out, e.g. regulations and incentives for women economic empowerment that could eventually lead to reconsidering restrictive gender norms. There needs to be an explicit two-tier approach, fostering both a competitive and high-added value digital economy, but also lower-skilled opportunities for women (and men) in digitally-enabled sectors. So far, Jordan has concentrated mainly on the first strategy, while the second strategy that would also enable more FLFP through digitalization, has not been fostered as much.

The current approach seems to be a clever dedication of available resources to competitive edge, respectively the reaping of low-hanging fruit: The digital economy is to some degree an 'island of efficiency': interviewees reported about less barriers and restrictive norms than in traditional sectors, i.e. suitable work conditions and reputational gains. As another advantage, gender stereotypes are not strong in Jordan's DDE and ICT education and ICT employment are not perceived as male-dominated fields. The digital economy (but not the mostly informal digitally-enabled economy) has the potential to make up for a reduction in public sector employment opportunities much sought-after by women.

Yet, barriers to female employment, such as social norms and occupational segregation, persist also in the DDE. This is less due to the digital gender gap, which is in Jordan relatively small and quickly closing but rather for pre-existing labour market segmentations. Women still face structural inequalities and stay within the limits of existing female labour market barrier, such as care responsibilities or mobility constraints. While the flexibility of online or remote work offers opportunities for female (self-)employment, for instance through home-based businesses or remote consultancy work, existing (gender) inequalities and market segmentations tend to continue or may even deepen in the DDE economy:

(i) Disparities between the formal and the informal DDE economy, such as online work, continue since recent policy reforms cannot overcome the different incentives and working conditions in the existing formal vs. informal private sector activities.

(ii) Rural populations gain more connectivity, but the DDE economy clusters in urban areas. This aggravates mobility constraints and the poor access of rural women to specialized job opportunities.

(iii) There is a skills gap in marketable digital skills, as the DDE economy draws on a segment of skilled labour.

The Jordanian experiences in the DDE cannot be read as a model or blueprint for gender-equitable job creation. Jordan has a relatively skilled (female) workforce, also in comparison to other middle-income-countries, and gender stereotypes in regard to ICT may be less restrictive than elsewhere, so its modest success in catalysing women employment in the DDE economy is not replicable by, or generalizable to other countries. At the same time, the difficulties and limits of this strategy show that, despite the rather favourable preconditions, digital-driven female job creation is complicated. Furthermore, this paper's findings should be corroborated by further research, especially on different segments of the private sector (firm sizes, economic sectors, etc.), as they view and navigate technological innovation and new labour regulations (e.g. on remote work).

Policy measures and reforms need to balance demands for a more gender-inclusive approach to digitalization ('leave no one behind') with the economic need for highly specialized and competitive clusters of digital excellence. Concrete policy measures that may mitigate the identified inequalities include the following:

(i) Formal sector: Provide incentives to motivate employers to approve requests for flexible work arrangements, e.g. in case of child illness or to incentivise hybrid work.[25] Existing laws and policies should be implemented and streamlined, and take into account women at all stages of their career (e.g. through co-leadership and part-time management). Lower taxes and rents in rural areas would allow for more private sector development to nudge labour demand also for less mobile rural women.

(ii) Informal sector: There is a need for more diverse role models better matching factors like educational background, social class or regional origin or an intersection of several factors. For instance, despite the strong push towards formalizing micro businesses, there should be a focus on role models aware of the particular challenges and barriers of informally working women. The goal is to make them visible, and support their networking and participation, for instance through rural e-commerce support programmes. Further measures would involve social insurance for informal workers or temporary tax waivers.

(iii) Skills: Though the overall digital skill level is relatively good, the skills are unevenly distributed. Targeted and advanced skills trainings should be designed in close collaboration with (future) employers; digital self-study courses e.g. for the reskilling of returning mothers should be developed and offered. Digital skill certificates for platform workers could be introduced nationally, or lobbied for internationally (Kässi & Lehdonvirta 2019).

(iv) Social norms: Provide awareness raising and social norm interventions for a more equal distribution of household and care responsibilities, so female remote work in the DDE does not lead to a double burden. Design information campaigns adapted to different groups (men, married women, unmarried women) that lay open widespread but hidden public support for FLFP (Gauri et al 2019).

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[Add Annex 1 List of interviewees]