

REPORT NO: ACS3685

FEASIBILITY STUDY: MICROWORK FOR THE PALESTINIAN TERRITORIES

FEBRUARY, 2013



**COUNTRY MANAGEMENT UNIT FOR THE PALESTINIAN TERRITORIES (MNC04) AND
INFORMATION COMMUNICATION TECHNOLOGIES UNIT (TWICT)**

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ABBREVIATIONS AND ACRONYMS

\$	All dollars are in United States' dollars unless otherwise indicated
AMT	Amazon Mechanical Turk
BPO	Business processing outsourcing
FTE	Full-time employee
ICT	Information communication technologies
IT	Information technologies
ITU	International Telecommunications Union
NGO	Nongovernmental organization
PA	Palestinian Authority
PITA	Palestine Information Technology Association of Companies
PT	Palestinian Territories
PTE	Part-time employee
SWOT	Strengths, weaknesses, opportunities, and threats
Territories	Palestinian Territories

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ACKNOWLEDGEMENTS

This report is prepared by Siou Chew Kuek, ICT Policy Specialist; Cecilia Paradi-Guilford, ICT Innovations Specialist; and international consultants Alexander Linden and Ihab Jabari. The report is funded by the World Bank's Country Management Unit for the Palestinian Territories (MNC04), and conducted by the Information and Communication Technologies Unit (TWICT). The findings, interpretations, and conclusions do not necessarily reflect the views of the Executive Directors of the World Bank or the governments they represent. The World Bank does not guarantee the accuracy of the data included in this work.

1. EXECUTIVE SUMMARY

Introduction

1.01 The purpose of this analytical study is to assess the feasibility of microwork for the Palestinian Territories' ("PT", or "Territories") socioeconomic development in general, and for employment opportunities for youth and women in particular. The study provides recommendations for microwork industry development in PT with the objective of increasing microwork businesses and employment of youth and women in the short-term, and building PT's comparative advantage in the microwork industry in the medium- to long-term.

1.02 The path towards Palestinian statehood and economic development remains challenging for PT. It faces comprehensive restrictions on movement and access, and limited economic growth has led to increasing unemployment, particularly among youth and women.

1.03 However the virtual economy could provide an option for mass job creation and income generation. Within the virtual economy microwork appears to be particularly relevant for PT, as it overcomes geographic boundaries to provide earning opportunities for workers with different types of skills and access to relatively basic digital infrastructure.

About Microwork

1.04 Microwork breaks down large pieces of business processes into small and simple tasks that rely on human intelligence, and distributes these "microtasks" to workers via the Internet for greater cost efficiencies across geographic boundaries. Typical microtasks include market research, media tagging, information gathering, data input, data verification, proof-reading, translation, copyediting, and graphic design. Tasks may also be dependent on language, location, classified by type of activity or content, and type of services or activities.

1.05 Although the microwork industry is relatively new, a distinct value chain is emerging from the relationships between these companies (figure below). They include: service providers transforming clients' problems into forms that can be addressed by microworkers; and aggregators collecting and hosting microtasks, and convening the workforce to complete microtasks. There is a wide spectrum of potential business models for microwork aggregators; included therein is an indirect model that has an intermediary sitting between the international aggregator and local workers, and that function as a legal entity (in the country where the workers reside) to hire workers and facilitate micropayments.

1.06 There are no comprehensive studies of the demographics of microworkers (infoDev, 2011). Existing sources suggest that there are hundreds of thousands of people around the world earning income from microwork (World Bank, 2012). Over one million crowdsourced workers have earned \$1 billion to \$2 billion in the past 10 years (Frei, 2009). However studies on Amazon Mechanical Turk (AMT), one of the earliest and most well-known generalized platforms for microwork, found that 47 percent of AMT workers live in the United States, 34 percent in India, and 20 percent in other countries. This shows that that microwork is able to attract workers in countries with relatively high wages, partly due to a "discretionary income"

effect. The analysis shows that the highest participation rate for AMT is by microworkers aged 21 to 25. AMT microworkers from India are predominantly single (55 percent), and significantly more of them perform microwork as a primary source of income as compared to those from the United States.

1.07 Microwork's global market size is relatively small, but the microwork industry has the potential to reach multibillion dollar revenues within the next few years. There are limited and varying estimates of the global market size for microwork, as numbers range from \$10 million to \$4.5 billion. Hence this study developed a simplified hypothesis that estimates the current global market size to be \$311 million and is reflected in employment of almost 1 million microworkers. There is no existing information on international experiences on the development of a country-level microwork industry; however there are limited-scale initiatives by the private sector and nongovernmental (NGOs) organizations across numerous countries; such as those by CloudFactory, MobileWorks, and Samasource.

Methodology

1.08 The study's methodology takes a four-step approach that: (a) reviews the global microwork landscape and experience, (b) conducts a competitive analysis, (c) distills key findings and provides recommendations on "go" or "no-go" decision, and (d) proposes next steps. The study uses an analytical framework for the information technologies (IT) and business process outsourcing (BPO) industry; as microwork is similar to IT-BPO except that it is less formal and structured in terms of organization and processes. There are various types of competitive analysis frameworks used by consulting firms to assess the general competitiveness of IT services-based industries, but it's generally agreed that the key factors determining the "location competitiveness" include availability of employable skills, competitive costs, access to relevant infrastructure, and an environment conducive to business investments and operations. However, the analysis will have to take into account that microwork and BPO have distinct differences in their structure and needs; therefore, the assessment adjusts these key factors in terms of their individual relevance and importance.

Competitive Analysis

1.09 The analyses use the compiling of pros and cons, SWOT (strengths weaknesses, opportunities, and threats), and economic analysis as decision making techniques to assess feasibility. The pros of microwork for PT is its significant potential for reducing high unemployment and underemployment of youth and women due to its ease of entry, flexibility in skills requirements, and ability to overcome the movement and access restrictions in PT. Microwork can be a significant channel for youth empowerment through employment by providing a channel to earn and work as they prefer. The generally cons of microwork apply directly to PT. Cloud labor is almost entirely unregulated; workers receive low wages, are given no benefits, have no job security, and risk being dehumanized due to division of labor and mass production.

1.10 The SWOT (strengths weaknesses, opportunities, and threats) analysis' results are as follows:

- (a) *Strengths.* PT benefits from demographic characteristics that put it in a favorable position to supply microwork. It has a population of tech-savvy young people, and this is underscored by a 35 percent Facebook penetration. The high number of underemployed and unemployed skilled women in cities outside of Ramallah offers a valuable source of labor, and Palestinians have a regional advantage in the use of the English language. The cost for access to Internet or broadband is relatively competitive from a regional perspective. Palestinian youth and women are familiar with, and have ready access to computers and Internet needed for microwork. The Palestinian labor law has no specific restrictions for microwork, and the laws do not appear to be burdensome to microwork aggregators or service providers.
- (b) *Weaknesses.* PT's relatively high labor cost appears to be the key impediment for microwork in the Territories. University undergraduate students have unrealistic expectations of wage levels, and the potential labor force is dwarfed by competitor countries with significantly larger populations. However it is noted that the PA has recently passed a measure that established a wage of 1,450 NIS per month (\$387.41), which is estimated at 8.24 (\$2.20) per hour. PT lacks a cost-effective mechanism to process international micropayments to Palestinians—such as PayPal or mobile banking—which makes it impractical for most Palestinians to perform microwork directly for international aggregators. Moreover it is risky and burdensome for United States-based aggregators to transfer funds to PT as such transfers have to comply with rigid laws designed to prevent the financing of terrorist activities.
- (c) *Opportunities.* The high unemployment and under-employment among educated youth and women provides a significant labor pool for microwork. Microwork's ability to add to discretionary incomes can attract the interest of youth and women in the same way it attracted many microworkers from the United States and Europe.
- (d) *Threats.* Due to lower labor costs, PT's market niche will have to be defined carefully to ensure global competitiveness. Attracting foreign investment and clients is challenging and is due to the perception of difficulties stemming from the Israeli-Palestinian conflict.

1.11 A simplified economic analysis was conducted to assess microwork's potential to impact employment levels and its benefits to the Territories' economy. It assumes that all employment is for part-time employees (PTEs), and uses the number of direct full-time employees (FTEs) as a benchmark to estimate the number of microwork PTEs. The approach is conservative and does not take into account indirect employment; and it uses four hours per week as the average time that Palestinian youth and women will spend on microwork. The results are summarized in Table 1.

Table 1. Microwork’s Potential for Employment

Employment in Five Years (as a percentage of ICT sector employment, in equivalent PTEs)	Number of Microwork PTEs	Total Earnings by Palestinian Microworkers (\$ million)	Industry Value Add (NPV) (\$ million)
20	21,840	9.35	4.57
50	54,600	23.38	11.43

1.12 There are limited studies on the social impact of microwork. A study conducted on India (Sharanappa) using Amartya Sen’s approach to capability as the theoretical framework found that microwork can potentially create employment for large numbers of people living in poverty, and make a positive impact on their capabilities and lives.

Findings, Conclusions, and Recommendations

1.13 The analysis shows that the youth of PT comprise a workforce that is readily available, skilled, and accessible to microwork; and that Palestinian youth have adequate access to computers and Internet. However PT has a comparative advantage in only limited types of microtasks, and this is largely due to its relatively high labor costs. The strongest advantage for the Territories is in microtasks that use the English and Arabic language pair because of Palestinian’s high-level of English proficiency compared to that of other Arabic speaking countries. However PT may be able to compete in the mass microwork market consisting of simple and lower-paying microtasks. Palestinian youth and women may be willing to accept a lower hourly wage (\$1 to \$2) as microwork has also attracted large numbers of workers from developed countries. PT may also be able to compete in tasks that border the microwork and e-lancing (virtual free-lancing) space, and local microworkers may be able command a premium above the minimal wage for quality outputs.

1.14 Microwork is expected to be more feasible in population centers outside Ramallah, due to differences in wages and standard of living. The Territories should target specific demographics as potential microworkers. Microwork intermediaries are needed in PT to overcome some of the key challenges, mitigate the business risks in PT and add-value to the industry. This includes facilitation of international micropayments, and acting as trusted entities for United States-based aggregators to comply antiterrorist financing laws, providing localized platform, and improving the quality of outputs. However the intermediary’s form, structure, focus segments, location, etc., should be well-defined to ensure the right combination to result in various potential business and operational models. The economic analysis indicates that microwork can have significant impact on employment for Palestinian youth and women, and add much needed value to the industry and PT’s economy.

1.15 In conclusion, the feasibility study suggests that microwork has significant potential to improve PT’s employment, and earnings of youth and women; but PT will need to take deliberate steps to develop a microwork industry as it will not grow organically. International aggregators are unlikely to consider the Territories for microwork due to the relatively small size of the potential workforce, high labor cost, lack of facilities for cost-effective international micropayments, burdensome due diligence on every microworker for compliance with antiterrorist financing laws, and the perception of poor security conditions.

1.16 The use of local intermediaries can address some of these main challenges for the Territories and add-value to the industry, but microwork needs to be examined further from a practical perspective to address other possible issues; such as the most suitable business and operational models, and Palestinians' willingness to work on tasks that pay below market wages.

1.17 It is recommended that PT explore developing its microwork industry on a cautiously optimistic, limited, and selective basis. Microwork's feasibility in PT's unique context will need to be tested in two pilots (at least) to address the mix of possible issues. The next step is proposed to prepare the ground for well-designed pilots, and to ensure that PT can realistically, comprehensively, and effectively test the mix of possible issues. In addition, in preparing for the pilots, the next step should facilitate the set-up of partnerships between international aggregators and potential local intermediaries, as formalizing such partnerships can take longer than six months.

1.18 A concept-level strategy and implementation plan is developed to provide to a general and mental conception of PT's roadmap and next steps for microwork industry development. Here the immediate strategic goal for PT is to have well-designed pilot programs for microwork, and facilitate networks and partnerships for the pilot intermediaries. The short-term goal for the microwork industry is to confirm the development approach and structure, comparative advantage in the identified microtasks, and the sustainability of microtask work (simple and low-paying) by Palestinian youth and women. In addition, the main strategic focus is to develop both niche and mass market segments. The strategic approach is to use well-designed, selective, and limited piloting to confirm PT's comparative advantage in identified microtasks; to validate Palestinian youth and women's interest in mass and low-paying microtasks (due to the potential to impact development); and to use intermediaries to overcome PT's inherent challenges related to international micropayments.

1.19 The feasibility study also outlines an implementation plan for the short-, medium-, and long-term; and it suggests appropriate roles for various stakeholders in the microwork industry; development processes including the roles of government, donors, private sector, academia, NGOs, and Palestinian youth and women.

2. INTRODUCTION

Purpose

2.01 This study assesses the analytical feasibility of microwork for PT's socioeconomic development, in general, and in particular its employment of youth and women. The study also provides recommendations for next steps in its development, including steps for practical exploration of feasibility. It will also provide high-level strategies and plans for microwork in PT.

Background and Rationale

2.02 PT's path towards Palestinian statehood and economic development remains challenging. The Palestinian Authority (PA) recognizes that the legitimacy of its government depends on its capacity to deliver equitable socioeconomic development to the people (PA, 2008). However, the comprehensive restrictions on movement and access remain the main challenge for economic recovery. As of the first quarter of 2012, the overall unemployment rate was 23.9 percent, with Gaza unemployment remaining high at 31.5 percent (Wafa, 2012), and with significant youth unemployment (46.5 percent in Gaza). The gap between the overall participation rates of males (69.5 percent) and females (18.7 percent) is also large (World Bank, 2011), and there is a persistent need to accommodate young workers as PT has one of the world's highest population growth rates.

2.03 The digital economy has resulted in the emergence of new marketplaces and value chains that provide digital earning opportunities for semiskilled and low-skilled workers with access to relatively basic digital infrastructure. Microwork (as part of the paid crowdsourcing development) is one particularly promising area of the new "virtual economy" as it has implications for significant economic and social development, especially as it relates to the employment of young people between the ages of 21 to 35, in general (Ipeiritis, 2010),¹ and specifically for women in developing countries.

2.04 In PT microwork appears to be promising from a perspective of socioeconomic development. In addition to infrastructural readiness (such as accessibility to affordable Internet and broadband in certain regions); the Territories offers a young and educated workforce highly suitable for such work. Palestinian youth (in general) possess basic computer and language skills at competitive wage rates; unemployment rates are comparatively high by global standards (CIA, 2010),² and the Internet has become the preferred medium of information exchange as an indirect result of the movement and access restrictions (UNESCWA, 2003). According to the International Telecommunications Union (ITU) the percentage of individuals using the Internet in the PA's governorates in 2010 was 37 percent; which is comparable to Jordan (38 percent) and Lebanon (31 percent), and significantly higher than Algeria (13 percent), Egypt (27 percent) and Syria (21 percent) (ITU, 2011). By working

¹ Surveys of Amazon Mechanical Turk's microworkers indicate that most are between the age of 21 to 35 years old, and is viable for women in developing countries since it can be performed by stay-at-home parents, and unemployed and underemployed workers. The survey indicates that up 65 percent of microworkers in the United States, and 30 percent in India are women.

² Unemployment rate ranking is based on the lowest to highest percentage of a country's labor force without jobs. Out of 200 countries the West Bank is ranked at 171, and Gaza Strip at 185.

over the Internet, disadvantaged youth and women in PT can overcome physical and other social restrictions to earn much needed income.

2.05 However the microwork industry is expected to become more competitive as the industry matures and more countries and microworkers join the marketplace. Thus, PT will need to assess the: (a) types or segments of microwork where its youth and women can reasonably compete; (b) existing physical and infrastructural realities; and (c) geographies or governorates where such work is most relevant given its socioeconomic situation. This feasibility study will examine these factors to provide a useful analytical foundation to understanding the feasibility of microwork in the Territories; and relevant recommendations for the next steps for practical exploration and industry development. This study will feed directly into other related projects by the PA and/or donors. It will provide valuable inputs for the Market Development Trust Fund being prepared by the World Bank's Finance and Private Sector Development unit, as it already includes microwork-related activities such as enterprise access to innovative businesses and a matching grant scheme.

Resources and Scope

2.06 This study is conducted by a team of World Bank staff and consultants with relevant experience and expertise on ICT-related industry development, innovations, and private sector microwork development. The study's scope is focused on analyzing the feasibility of microwork in general, across various types of microtasks that are performed virtually over the web.

2.07 Due to the limited scope of this study, its geographic coverage is limited to the top population centers in PT. Based on the PA's statistical references these include Gaza, Hebron, Jerusalem, Nablus, and Ramallah (PCBS, 2011b). In terms of demographics, given its high unemployment rate, the study focuses on Palestinian youth (15 to 24 years of age)³—as most of the world's crowdsourced workers fall within this age group.

3. ABOUT MICROWORK

Definition and Description

3.01 Microwork breaks down large pieces of business processes into tasks that are small, simple, and rely on human intelligence; and distributes these microtasks to workers via the Internet for greater cost efficiencies across geographic boundaries. Microtasks are typically tasks that cannot be performed effectively or efficiently by machines; but can be completed in seconds or hours by microworkers. Such virtual workers are remunerated a few cents or dollars per microtask.

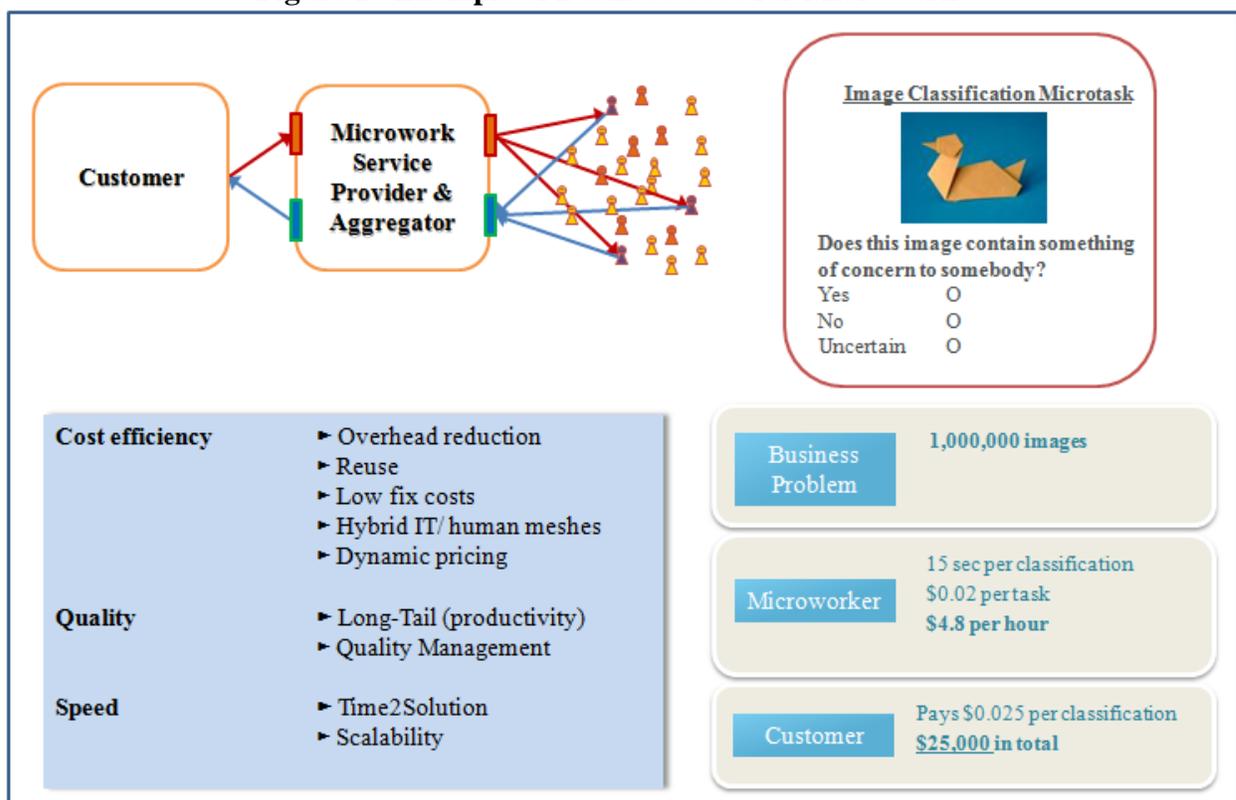
3.02 Microwork is a form of paid crowdsourcing, which takes *“a job traditionally performed by a designated agent (usually an employee) and outsources it to a generally large group of*

³ Based on the United Nations' definition of youth. Available at: <http://social.un.org/youthyear/docs/UNPY-presentation.pdf>

people” (Howe, 2006). In the virtual marketplace companies can seek workers through task or project marketplaces, for instance, on websites where companies or persons post requests and individuals looking for work respond. Such task marketplaces can be divided roughly into two categories: those specializing in high-level professional services and those catering to microwork. The former group consists of sites such as Elance, Guru, and 99designs that facilitate large and complex tasks, such as software development and graphic design projects. Such marketplaces have been around for years, but recently microwork has emerged as an innovative approach for outsourcing. AMT is an early and well-known task market place. It carries many simple tasks that can be completed in seconds or up to an hour.

3.03 Typical microtasks include market research, image classification, media tagging, information gathering, data input, data verification, proof-reading, translation, copyediting and graphic design. Within such as areas of work, microwork is based on so-called microtasks to "label a certain image," "describe a particular product," "classify a given text," "translate a text," and "design a logo for a given context." The difference between classification and tagging is described in Annex I, and more information on segmentation is presented in Table 2. Figure 1 gives an example of the business case for microwork.

Figure 1. Example of Business Case for Microwork



Source: By authors.

3.04 Microwork is a form of remote work and outsourcing, and there are various other related models of remote work in the global landscape. BPO, for example, takes whole

business processes that are well defined, and transfers them to a region with lower pay-scales. In contrast, microwork provides discrete units of work to workers located anywhere in the world. Microwork can also be contrasted to the virtual freelancing (or “e-lancing”) project sites such as Elance, oDesk, Guru, etc. e-Lancing involves typically larger, more creative projects (creating a market research report, a software program, a power-point presentation); and can be "outsourced" abroad to specific, mostly individual professionals with specific skills. Although the boundaries between paid-crowdsourcing and such project sites are becoming increasingly blurry (e.g., in the case of logo and graphic design, or in the case of logistical and mobile services); the difference between these two versions of outsourcing is that microwork tasks are typically much smaller in size. The smaller task sizes also allow for significantly higher integration in automated workflows and quality management. The task sizes are often so small that it is crucial that the work is conducted inside the webpage (a webform) that is typically provided by the microwork website. Table 2 gives a conceptual delineation between these remote work models.

Table 2. Models of Remote Work

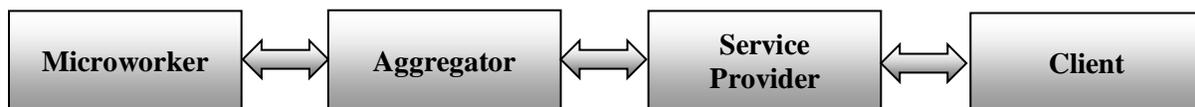
Models	Paid Crowdsourcing		BPO
	Microwork	E-Lancing	
Skills	Basic computer and language	Medium- to high-level computer and software programming/coding	Medium-level
Tasks	Highly well-defined, commoditized tasks; typically small size of 10 seconds to 60 minutes effort	Self-contained tasks that require minimal communication; typically medium-range size of two days to six weeks' effort	Whole business processes - often the tasks are of all kinds
Workers' Tools	Own equipment or facilitated	Own equipment	Equipment provided by employer

Source: Adapted from infoDev, 2011.

Value Chain Roles and Business Models

3.05 Various kinds of participants, specialized in different functions are involved in the microwork industry. Although the industry is still young, a distinct value chain can be seen emerging from the relationships between these companies. This is shown in Figure 2, where the roles of the service provider and aggregator are shown:

Figure 2. Basic Value Chain in Microwork Industry



Source: Adapted from InfoDev, 2011.

- Service providers take clients problems and transform them into forms that can be addressed by microworkers (infoDev, 2011). They typically carry out the process of work decomposition, including appropriate quality management (e.g., selective proof-reading, peer-review, and statistical process control). This is not trivial and typically requires excellent understanding of the given problem in areas such as audio transcription, translation, and digitization. Service calls includes work for transcribing an audio file (e.g., CastingWords, SpeechInk) or copyediting (e.g., serv.io, CrowdFlower), or whatever product an end-user needs.
- Aggregators (also called task marketplaces) are entities that collect and host microtasks, and convene the actual workforce needed to complete these tasks. They take the well-defined work descriptions (often via a software-interface) and distribute them to workers. Aggregators will also ensure that tasks are distributed microworkers with the relevant qualifications. Each aggregator can have a different approach for building a workforce, and can cater to different kinds of skill needs. The size of the workforce that takes on tasks from an aggregator varies in size. For example AMT, Clickworker, and microtask each claims to have hundreds of thousands registered workers.

3.06 Based on the limited international experiences (to date) there are variations in business models for microwork aggregators, and these are evolving as the global industry develops. There are hybrid models in the microwork value chain, where the two functions of service provider and aggregator are conducted by one legal entity (e.g., utest.com, serv.io, crowdsource.com, cloudfactory.com). Many of these hybrids also use other aggregators to outsource some of their peak loads. For example, Crowdflower, microtask.com, MobileWorks and others are known to be service providers as well as aggregators, and they may also use other aggregators (e.g., the masses of microworkers at AMT). However business models of these microwork players cited may change over time as they adjust to market dynamics, and respond to developments in this relatively nascent industry.

3.07 It is possible to have an indirect model that includes an intermediary in the value chain. This intermediary typically sits between the international aggregator and local workers, and functions as a legal entity in the workers' country. The intermediary hires the workers, and/or facilitates micropayments to mass of local microworkers. This helps the international aggregators address the issue of accommodating each countries labor laws, their liability across borders, and the lack of cost-effective mechanisms for international micropayments in some countries.

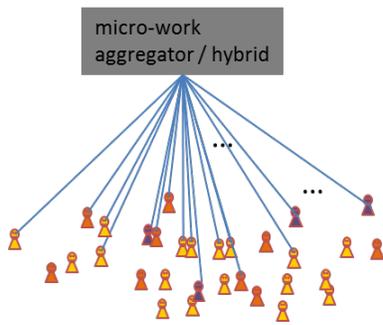


Figure 3. The direct model, where microworkers sign individual contracts with aggregators or service provider.

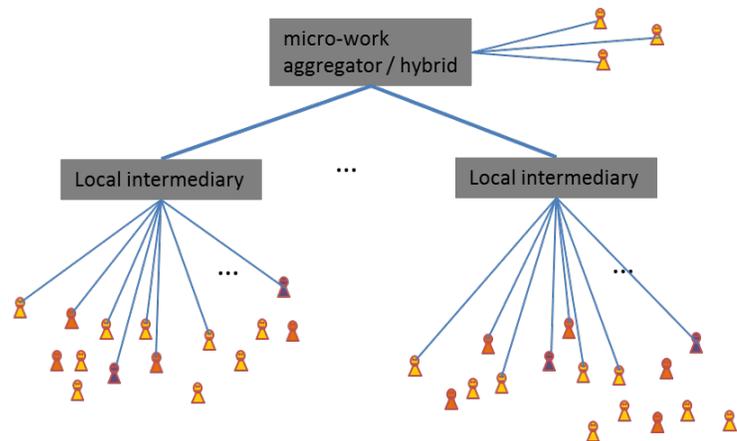


Figure 4. The indirect model, where a local intermediary will sign one master contract with an aggregator; and individual contracts with local microworkers. In this way the cross-border risks for international aggregators are significantly reduced as they only have cross-border contracts with intermediaries (instead of individual, cross-border contracts with masses of microworkers); and issues with cross-border payments can be significantly reduced.

Segmentation

3.08 There are many ways to segment the types of microwork. One dimension is the language that needs to be used to perform the work (e.g., proofreading in a particular language). Based on the authors' estimate, about 30 to 50 percent of microtasks are language-independent, e.g., finding patterns in picture (object recognition) or image classification. "Location" is also a key variable with quite a few types of microwork, such as collecting information at a location, or taking pictures or collecting GPS floating data (Box 2). Nevertheless, most microwork can be performed from any location in the world—microwork is location-independent. Some microwork scenarios require a level of cultural knowledge or sensitivity (e.g., tagging product descriptions), because the perception and structure of media and language is often a matter of personal preferences and taste, and therefore culturally sensitive.

3.09 Another interesting but comprehensive way of segmenting microwork is by the type of service/content and activity. Based on this approach Table 3 shows examples of the different types of microtasks that are performed in the commercial market. However, these examples are not representative in scope due to the wide diversity of task types. Additionally, the types of microtasks and their market sizes are growing due to increasing awareness of microwork as an outsourcing approach.

Table 3. Examples of Microtask by Type of Service and Activities

1 = language-independent 2 = language-dependent

A = location-independent B = location-dependent

C = cultural-sensitive

Type of Service / content	Type of Activities				
	Creation / Design	Editing	Analyzing (e.g., Tagging, Classification, Comparing)	Compiling (translation from a source into a target format)	Evaluation / Verify
Text (All A2 = language-dependent but location-independent)	<ul style="list-style-type: none"> Content Creation (write a product description) Create in-text-ads 	<ul style="list-style-type: none"> Proofreading 	<ul style="list-style-type: none"> Tag texts (e.g., for buzz (sentiment) analysis of social media) (C) Extract meta tags from web-pages (Search Engine Optimization) search relevance classification (e.g., comparing two search engine results relative to its relevancy to a search query) 	<ul style="list-style-type: none"> Translation Repurpose Text (C) 	<ul style="list-style-type: none"> Does the text fit the intended purpose? (C) Evaluate slogans (C)
Image	<ul style="list-style-type: none"> Logo Creation (e.g., 99designs) (A1C) Photo Creation (e.g., iStockPhoto) (A1) Other designs (e.g., spreadshirt) (A1) 	<ul style="list-style-type: none"> Extract Images (e.g., image-cropping for product catalogs) (A1) Photo enhancement (for product catalogs) (A1) 	<ul style="list-style-type: none"> Tag images for improved search (A2) Classify images (Number plate recognition, to spot strange behavior (surveillance) (A1) 	<ul style="list-style-type: none"> Document capture (extracting field information) (A1 / A2) 	<ul style="list-style-type: none"> Does the image fit the intended purpose? (A2C)
Audio	<ul style="list-style-type: none"> Create audio announcements (A2C) 	--	<ul style="list-style-type: none"> Audio Tagging (for search engines) (A2C) 	<ul style="list-style-type: none"> Transcript audio (A2C) 	<ul style="list-style-type: none"> Does the audio fit the intended purpose? (A2C)
Web Information Search	<ul style="list-style-type: none"> Extract Information from given websites (Find emails of corporate officers ; Find restaurants in a given location) (A2) Research websites (A2) 	--	<ul style="list-style-type: none"> Check facts (mostly A2 - often C / cultural sensitive) 		<ul style="list-style-type: none"> Fact checking (Is a restaurant still at a given location?; Is a person still at a company?) (mostly A2)
Video	<ul style="list-style-type: none"> Create videos (can be any of A or B and 1 or 2) 	<ul style="list-style-type: none"> Video editing (repurposing, finding positions for in-place ads) 	<ul style="list-style-type: none"> Annotate Videos (for better search and navigation, and advertisement) 	--	--

Type of Service / content	Type of Activities				
	Creation / Design	Editing	Analyzing (e.g., Tagging, Classification, Comparing)	Compiling (translation from a source into a target format)	Evaluation / Verify
		(A2)			
Mobile	<ul style="list-style-type: none"> Acquire information (e.g., GPS data, geo-information) (B1 or B2) 	--		--	<ul style="list-style-type: none"> Verifying certain geo-information (B1 / B2)
Creative Design	<ul style="list-style-type: none"> Create a design 	--	<ul style="list-style-type: none"> Does a design fit certain requirements? 	--	--
Products	<ul style="list-style-type: none"> Create Product Presentations (A2) 	--	<ul style="list-style-type: none"> Does product fit a given category or phrase? (A2) Tag a product (A2) 	--	<ul style="list-style-type: none"> Evaluate if product presentations appeal to a broader audience? (A2)

Source: By Authors

3.10 Segments grow at different rates and are driven by factors such as globalization. Box 1 gives an example of the global translation market.

Box 1: The Growth of Microwork in the Global Translation Market

About the Global Translation Market

Globalization allows companies advantages of expanding business (be it selling, producing, or buying) throughout the world. Modern transportation and telecommunication systems have shrunk the importance of geographical distance. But the obstacle of the different languages hinders globalization. The most pressing demands come from a marketing perspective (content on websites changes rapidly, and then must be internationalized for the different markets); and from a selling perspective (easily, several millions of products are engineered every year), where product description must be customized and internationalized for different clients and different point of sales (Internet, retail shops). Here, price and time-to-market are big factors.

Translation, as performed in the traditional sense, is a costly and tedious exercise. Prices of \$20 to \$30 per page (250 words) are common. Translation agencies tend to be traditional and often they use emails to channel work and float it for task distribution and peer-review. The market size of the global translation market is expected to be \$26 billion by 2010.

(<http://www.common senseadvisory.com/Default.aspx?Contenttype=ArticleDet&tabID=64&moduleId=392&Aid=1062&PR=PR>)

Trends and Relevance to Microwork

But change is on the way. In the past five years, new and more agile companies are embracing crowdsourcing (including microwork) for creating international, and more seamless workflows. These include quality management, online-price quotes and direct online submission of texts. These leverage crowdsourcing principles by selecting only the best applicants from a typically large crowd; and accessing a motivated, on-demand workforce that's paid by piecework. In addition, crowdsourcing technologies allow tedious processes of the past to be handled efficiently, or become fully automated. This includes processes such as peer-review, task distribution, and invoicing and payment. For example, powerhouses in the translation industry like Lionbridge are discovering crowdsourcing as a new means to leverage their global network of 75,000 freelancers (<http://en-us.lionbridge.com/global-crowdsourcing/default.htm>); and offer a range of multilingual services related to in-market content review and editorial, keyword optimization, search relevance, consumer surveys, social media monitoring, etc. These new approaches have brought significant price movement. The Internet requires the use of more common and simpler language in task descriptions, which gives microwork approaches an additional edge over traditional translations agencies.

Company	Country Started	Year Service Created	Approx Workforce Size	Price Points (English -> Arabic)
onehourtranslation	Israel	2007	10,000	0.055 \$/word
Tolingo	Germany	2008	Unknown	0.15 \$/word
Clickworker	Germany	2009	Unknown	0.08 \$/word
serv.io	United States	2011	Unknown	Unknown
translationcloud.com	United States	2011	Unknown	Unknown
Lionbridge	United States	2011	75,000	Unknown

English-Arabic Translation

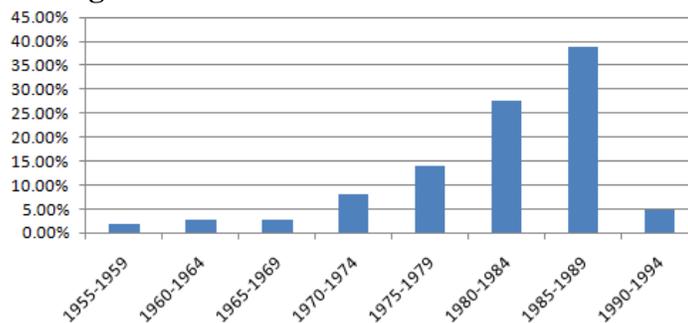
Written Arabic is widely standardized, and its spoken forms vary most of the time. Further break down of data on specific language pairs should be requested -and might only be available for the major pairs (the top five economic languages being Chinese, English, German, Japanese, and Spanish). Nevertheless, Arabic hovers at spot six or seven, challenged by French, Portuguese, and Russian. Statistics from Common Sense Advisory also show that translators based in Egypt earn around \$20,000 annually.

Demographics of Microworkers

3.11 There are no comprehensive studies of the demographics of microworkers (infoDev, 2011). Existing sources suggest that there are already hundreds of thousands of people around the world earning income from microwork (World Bank, 2012); and over one million crowdsourced workers have earned \$1 billion to \$2 billion in the past 10 years (Frei, 2009). However a partial picture can also be constructed by examining the demographics of the workers of individual work aggregators. Ipeirotis (2008, 2010) conducted surveys to examine the workers at AMT, colloquially known as “turkers.” The information on Indian microworkers is interesting as it is expected to be a closer representation the likely demographics for other developing countries as well. AMT is a generalized microwork platform for almost all types of microtasks; hence the participation rates and incomes are expected to be significantly lower than specialized tasks platforms that are used by task-type focused microworkers. The differences and examples are explained in the next section; and these AMT-focused studies found that:

- Country of origin: 47 percent of AMT workers live in the United States, 34 percent in India, and 20 percent in other countries. This participation rate is interesting, as it suggests that that microwork is able to attract workers in relatively high wage rate countries, in spite of its relatively low remuneration. This is partly due to the “discretionary income effect,” which is discussed in the pros and cons section.
- Age: For India the highest participation rate is by microworkers aged 21 to 25 (at the time of the study), as shown in Figure 5.

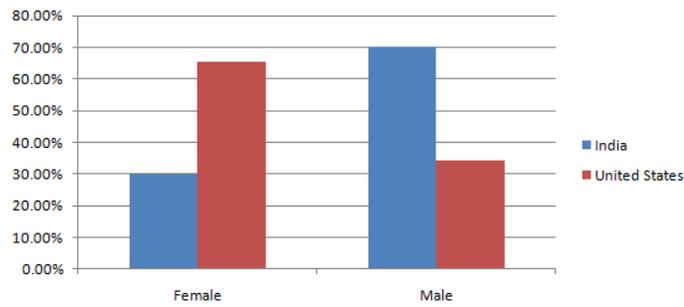
Figure 5. Year of Birth for Indian Workers



Source: Ipeirotis, 2010.

- Gender: Figure 6 illustrates the gender breakdown of AMT workers and shows an over-representation of women in the United States-based workforce. Most participants use AMT to supplement their income, and often AMT is used by stay-at-home parents, unemployed and underemployed workers, etc. Since women are more likely to fit into these categories, there is a corresponding increase in representation. On the contrary, more Indian workers treat AMT as a primary (or significant) source of income, therefore more men work on AMT.

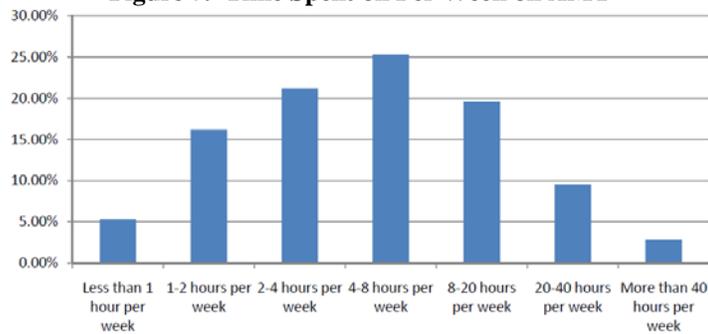
Figure 6. Gender Breakdown for AMT Microworkers



Source:
Ipeirotis, 2010.

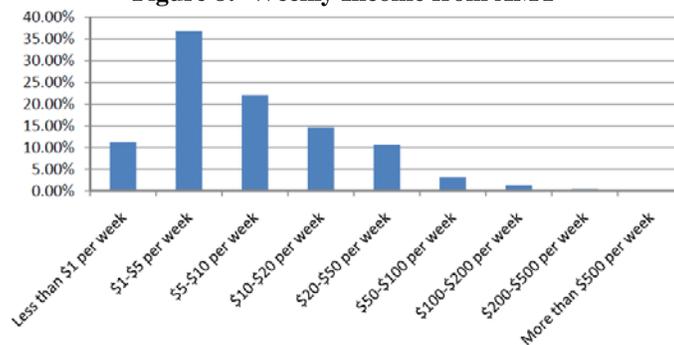
- Others: The study found that Indian microworkers are predominantly single (55 percent), and have household income of less than \$10,000 per year (55 percent). Very few Indian workers participate on AMT for leisure, and significantly more Indians do microwork as a primary source of income. Both the American and Indian microworkers also spend varying amounts of time on AMT (Figure 7), and the most common weekly income is \$1 to \$5 a week (Figure 8). However, AMT’s microtasks are typically lower paid, and there are wide discrepancies in income distribution from one company and project to another, since the industry is still young and growing (infoDev 2011).

Figure 7. Time Spent on Per Week on AMT



Source: Ipeirotis, 2010.

Figure 8: Weekly Income from AMT



Source: Ipeirotis, 2010.

Market Size and Trends

3.12 There are limited and highly varying estimates of the global market size for microwork. Estimates range from less than \$10 million to \$4.5 billion when microwork is included as part of impact sourcing (infoDev, 2011; Monitor, 2011).⁴ In order to provide a more reasonable perspective this study developed a simplified hypothesis (Annex II), which estimated the current global market size to be \$311 million, and is reflected in employment of 997,250 microworkers. This estimate appears more representative given that: (a) the revenue from single microwork aggregators, like utest, onehourtranslation, textbroker, etc., are expected to exceed \$10 million each; and (b) the estimate is compared to related and neighboring markets. The appraised market size also fits within the \$4.5 billion estimate for impact sourcing, since microwork is a small and rapidly growing part of the larger impact sourcing market. The estimate is minuscule when compared to the global business process outsourcing industry (excluding voice-based/call center services), which is estimated to reach \$70 billion to \$73 billion by 2016 (BPAP, 2010). There is limited information on the size on the various microwork segments, though such information should be available in the near future given the expected high growth rates of the industry

3.13 There are a growing number of microwork service providers and aggregators and these include private sector driven models like AMT, CloudFactory, CrowdFlower, and MobileWorks; and development-oriented models like Samasource. Specialized models have developed in the market whereby the service provider or aggregator (or a hybrid of both) is involved in only particular segments of microwork. This is in contrast to the challenges of operating generalized microwork sites like AMT; as specialized platforms offer the advantage of developing domain expertise, understanding the needs of targeted clients, holding networks of specialized microworkers, and platforms that are tuned for ease of use in that segment. Utest.com, Onehourtranslation.com and textbroker.com are examples of specialized models in the usability, testing, translation, and copyediting segments.

3.14 There is increasing awareness of microwork's potential for development. For example, an m2Work challenge was recently launched with InfoDev and Nokia's Ideas Project, with funding provided by UKaid, to catalyze ideas on the use of mobiles for microwork (Box 2).

⁴ Impact sourcing is referred to in the Monitor study as the use of business process outsourcing services to employ people at the base of the pyramid, to provide high-quality, information-based services to domestic and international clients. The definition includes microwork, and the study also includes microwork aggregator such as Jana and Samasource for its estimates.

Box 2: The Global m2Work Challenge

The the m2Work challenge was launched by InfoDev and Nokia's Ideas Project (funded by UKaid in early 2012) to aid digital job creation in developing countries. It calls on participants to identify real-world problems that could be addressed by millions of underprivileged people equipped with Internet-connected mobile phones, and awarding \$40,000 worth of prize money to the most innovative ideas. The purpose of the m2Work challenge is to accelerate the emergence of microwork that can be completed on mobile phones, thus creating digital earning opportunities for some of the world's least well-off, who may not have access to computers to do microwork but do have access to mobile phones which are becoming ubiquitous with (Lehdonvirta, 2012).

The challenge drew a total of 939 ideas from all over the world, 96 percent of which came from developing and emerging economies. The results are not surprising as most countries where submissions originated from already have experienced microwork, which may have made it easier for ideators in these countries to propose ideas (Lehdonvirta, 2012). At the end of April 2012, the m2Work challenge selected the six finalists who received a cash prize of \$2,000, business coaching, a platform to pitch their ideas to the grand jury, and the chance to win the grand prize of \$20,000. The finalists's ideas were in the areas described below. The winner was announced in May 2012 as the "Smart Rickshaw Network" by Aadhar Bhalinge of India (description below).

- Environment: Alexander Shakaryan of Armenia was recognized for "MicroForester," a distributed reforestation project. "Game Tracking and Identification," an initiative by South Africa's Karl Zöller, deploys microworkers in the fight against illegal poaching of endangered species.
- Human development: Nadia Millington of Trinidad and Tobago and Luis Rosenthal of Brazil advanced to the final round with "Microwork, medical mobile diagnostics," which would allow paraskilled health technicians to deliver medical information to remote areas. Similarly, "Smart Blackboard: Micro-Tutorials" by Nancy Wang of Kenya would allow hundreds of thousands of unemployed or underemployed teachers to work directly with children who struggle in overcrowded schools.
- Social development, open data and access to information: "Microwork-based Social Publishing for Empowerment," by Jeongtae Kim of the Republic of Korea, would expand a UNESCO project's ability to spread valuable texts in all language. On the other hand "Smart Rickshaw Network" by Aadhar Bhalinge of India, would organically crowdsource maps at very low cost in developing nations, by employing fleets of rickshaw drivers as microworkers to feed live traffic, landmark and tourist hotspots updates into a subscription service. This will help rickshaw drivers from the bottom of the pyramid to earn additional income, and address the problem of traffic congestions (InfoDev, 2012).

International Experiences

3.15 There are no known international experiences of microwork industry development at a country-level, and this is probably due to microwork's recent emergence. However, some initiatives were taken at the institutional levels by the private sector on a larger scale, such as AMT, CloudFactory, CrowdFlower, and MobileWorks; and others by NGOs such as Samasource in a limited scale. These are described below.

- *Amazon Mechanical Turk (AMT)* is a platform that emerged from Amazon, which is arguably the most widely known marketplace for microwork. It is estimated to have

500,000 microworkers in 190 countries.⁵ and the Mechanical Turk web service enables companies to access its marketplace and a diverse, on-demand workforce; then programmatically integrates the results of that work directly into their business processes and systems. Developers can leverage this service to build human intelligence directly into their applications. Mechanical Turk aggregates microtasks (called Human Intelligence Tasks or “HITs”) that include identifying objects in a photo or video, performing data de-duplication, transcribing audio recordings, and researching data details (Ross et al, 2010). AMT has been criticized for offering little opportunity or method for negotiation between the so-called turkers and employers. Amazon’s terms of use, to which both parties agree, functions as the transaction’s only governing document. This agreement asserts that microworkers will perform services as independent contractors, and not as employees. Amazon clearly strives to extricate itself from disputes that may emerge during the course of the transaction. AMT has been compared to mass production whereby workers are subject to low wages.

- *CloudFactory* connects over 500,000 microworkers from the bottom of the pyramid to job opportunities. It currently has microworkers in Algeria, India, Nepal, Nigeria, the Philippines, and Saudi Arabia. Together with Kiva, CloudFactory provides microworkers with a microloan to purchase the required tools to successfully complete microtasks. Some businesses use CloudFactory to have Cloud Labor be the driving engine behind their applications or services. Others integrate with the CloudFactory API to add features and automate maintenance tasks in a support role. CloudFactory currently caters to a variety of microtasks that includes: digitization, data processing, content creation, categorization, content moderation and editing, translation, surveys, and web research (CloudFactory, 2012a). One of the interesting approaches of CloudFactory is in terms of organizing microworkers into solidarity groups based on the Grameen Bank approach for microfinance. This allows CloudFactory to leverage a reproducible approach and social capital for operational effectiveness and microworker development.
- *CrowdFlower* is a leading enterprise crowdsourcing platform to solve problems ranging from product categorization to business lead verification to content creation. CrowdFlower started in 2007 and since then it claims to have access to 2.5 million contributors (microworkers) worldwide, with approximately 60 percent cost savings for clients compared to traditional methods of outsourcing. CrowdFlower received \$5 million from venture capital funds Bessemer Ventures and Trinity Ventures, and another \$1.2 million from angel investors at the height of the recession. CrowdFlower’s clients include: Microsoft, eBay, LinkedIn and AT&T. Of the tasks that CrowdFlower handled in 2009, half were done through online gaming channels and paid for with virtual cash, 40 percent were executed by outsourcing companies and AMT and paid for with real money, and 10 percent of the work was paid through rewards and coupons. CrowdFlower embeds its tasks in online games like FarmVille, Restaurant City, It Girl, Happy Aquarium, Happy Pets, Happy Island and Pop Boom. This means that the estimated 80 million gamers—from teens to homemakers—who play such games can be transformed into a virtual workforce. This avenue does present the challenge of using

⁵AMT does not provide official numbers, hence this estimate is based on various sources; such as <http://crowdresearch.org/blog/?p=2135> and <https://forums.aws.amazon.com/thread.jspa?threadID=58891>.

underage gamers, which is why CrowdFlower does not put certain tasks on games—such as those involving pornography. According to CrowdFlower CEO, Luke Biewald, the company tried to “humanize” the process of microwork through the creation of a closer connection with the workers. This effort includes (online): the reason for undertaking the tasks; a “thank you” to the workers for doing a good job, and it provides contact information (e-mail address and phone number) to resolve problems. The same task is given to several people to ensure quality (Mahajan, 2010). In 2011, Crowdflower was involved in a philanthropic project in Somalia to crowdsource citizens’ opinions on the crisis in the country. The purpose of this project was to catalyze global media’s attention on Somalia by letting local voices take center stage, and highlights these voices on a live, public map to observe and engage in a global conversation with people of Somalia (Meier, 2011).

- *MobileWorks* is a microwork provider with registered microworkers in 24 countries. It operates in numerous countries; including India, Ghana, Lithuania, Pakistan, the Philippines, and the United States; and is interested to expand to the Middle East and North Africa region. MobileWorks evolved its business model from microwork aggregation to building a new platform that is better suited to developing countries. It adopted the AMT platform and made it available in a mobile format, which it tested in Mumbai as well as in a rural village outside of Delhi. This model did not work as the AMT platform did not have the appropriate tasks for the selected workers and they were not able to earn as much as they hoped. This challenge highlighted the huge disparity in the microwork market in terms of complexity and quality of tasks and payment delivery. As a result, the MobileWorks built a new platform—as a functional replacement of AMT—that is accessible through computers and mobile phones; and better serves the interest of workers at the bottom of the pyramid, and provides better quality products for its clients. In its new role, MobileWorks automatically assigns tasks to its microworkers based on their skills, and tasks are typically standardized around few areas such as digitization (character recognition, data entry), fact finding, and online research. Tasks vary according to customer requirements and geographic locations with different cost structures. Through its new business model, there is limited risk for nonpayment as workers earn a flat hourly wage. Through the platform MobileWorks monitors the time it takes each worker to complete a task. Mobile Works uses PayPal and bank accounts to distribute payment to the microworkers. Their target workers are semieducated homemakers. Microworkers spend an average of two hours per day on MobileWorks, and most workers use the platform part-time.⁶
- *Samasource* is a nonprofit company that connects people living in poverty to microwork via the Internet. It provides content moderation, data entry, and other outsourcing services to clients including LinkedIn, Intuit, and the United States Department of State. Samasource provides microwork in the areas of: (a) content generation (e.g., enhancing databases, developing and applying taxonomies, editing or abstracting content); (b) data enrichment (gathering information and images, validating and enhancing business listings, categorizing databases and images); and (c) transcription services (e.g., digitizing receipts, enhancing OCR [optical character reader] of textbooks, transcribing

⁶ Authors’ interview Anand Kulkarni of MobileWorks, April 2012.

and tag audio and video files). Samasource's San Francisco-based sales and delivery teams work with clients to move large data projects to a proprietary online work distribution system, the SamaHub. Full-time workers around the world access SamaHub from delivery centers monitored by Samasource staff, and their account managers and quality assurance professionals ensure task quality, accuracy, and turnaround time. Samasource developed a technology that allows it to sit in the middle of the supply chain and manage separate relationships with customers and delivery centers. It operates 16 centers worldwide; ranging from Haiti to East, West, and Southern Africa, India, and Pakistan (there are currently no delivery centers in the Middle East and North Africa). Between 2009 and 2010, the Samasource experienced 400 percent in earned income, with a 10-fold increase in revenue to over \$2 million in 2010. Samasource sought funding from foundations and individuals. By 2011, it had raised \$4.5 million (Gino *et. al*, 2012).

4. METHODOLOGY

General Methodology

4.01 The methodology of this feasibility study is based on a four-step approach, consisting of the following activities:

- (a) Review the global microwork landscape and experience-to-date for characteristic, needs and preferences of microwork/microworkers; market sizing and trends, and best practices applicable to PT;
- (b) Conduct a competitive analysis by identifying a relevant analysis framework to analyze the attractiveness of PT for microwork; and use various decision making techniques;
- (c) Distill key findings from the analysis, and provide recommendations on “go” or “no-go” decision; and
- (d) Propose next steps; including a high-level strategic and implementation plan if the analysis finds microwork is found to be feasible.

4.02 To support the methodology the study's mode of research is described here:

- (a) Gather secondary data through desktop research, and in collaboration with the PA and donor programs in PT;
- (b) Gather information from microwork from various microwork practitioners through interviews, particularly information related to international and regional microwork aggregators;
- (c) Conduct extensive, on-the-ground consultations in various PT governorates, and with numerous Palestinian stakeholders to gather their suggestions to develop the microwork industry; and gather information on the Territories' demographics, skills levels and ranges, enabling environment and infrastructure. This includes dialogue with relevant PA agencies, donors, NGOs related to youth and women, academia at the high-school and university levels, local industry associations and ICT companies (call-centers and

BPO operations). Conduct informal group interviews with local youth and women, especially those from high schools and universities.

4.03 This feasibility study will encourage country inputs, ownership, and action on the report by collaborating with relevant stakeholders for its activities; and will promote the findings to relevant institutions such as the ministries related to labor, education, telecommunications and IT; Palestine Information Technology Association of Companies (PITA), Palestine Information and Communications Technology Incubator (PICTI); and local IT companies as possible entrepreneurs in microwork. A workshop on the findings will be conducted in PT where the report will be disseminated directly to relevant stakeholders, and through online or print channels and Internet sites.

4.04 There is limited information and experience on microwork due to its recent emergence. There is a lack of precedent for this study, as it is the first known country-level assessment for microwork, therefore the study will, inevitably, have significant sections based solely on the authors' assessments and opinions.

Analysis Framework

4.05 This feasibility study uses an analytical framework for the IT-BPO industry; as microwork is similar to IT-BPO except that it is in an informal and unstructured form (Table 4). There are various types of competitive analysis frameworks used by consulting firms to assess the general competitiveness of IT services-based industries; particularly for the relatively structured and formalized IT and BPO services market. While different categorizations are used in each model, the common key factors determining "location competitiveness" includes availability of employable skills, competitive costs, access to relevant infrastructure, and an environment conducive to business.

Table 4. Frameworks for Assessment of Locations for IT Services and ITES

AT Kearney's Global Services Location Index	Gartner's 10 criteria	Hewitt's International Benchmarking Model	McKinsey's Location Readiness Index
<p>People and skills availability</p> <ul style="list-style-type: none"> • Remote service sector experience and quality ratings • Labor force availability • Education and language • Attrition risk <p>Financial attractiveness</p> <ul style="list-style-type: none"> • Compensation costs • Infrastructure costs • Tax and regulatory costs <p>Business environment</p> <ul style="list-style-type: none"> • Country environment • Infrastructure • Cultural exposure • Security of intellectual property 	<p>Infrastructure</p> <ul style="list-style-type: none"> • Power, telecommunications, transport <p>Labor pool</p> <ul style="list-style-type: none"> • Quality, quantity, scalability & work conditions <p>Educational system</p> <ul style="list-style-type: none"> • Quality, number of institutions, new grads in IT <p>Cost</p> <ul style="list-style-type: none"> • Labor, real estate, infrastructure & telecom <p>Political and Economic Environment</p> <ul style="list-style-type: none"> • Stability of government, corruption, geopolitical risks, Financial stability <p>Language</p> <p>Government support</p> <ul style="list-style-type: none"> • Promotional, institutional & education <p>Cultural compatibility</p> <ul style="list-style-type: none"> • Cultural attributes, adaptability, proximity, ease of travel <p>Global and Legal Maturity</p> <p>Data and IP Security and Privacy</p>	<p>Infrastructure</p> <ul style="list-style-type: none"> • Real estate • Telecom • Power <p>Connectivity</p> <p>Talent</p> <ul style="list-style-type: none"> • Availability • Quality • Cost <p>General demographics</p> <p>Environment</p> <ul style="list-style-type: none"> • Macroeconomic • Business environment • Geopolitical environment <p>Clusters</p> <p>Incumbent IT/ITES industry</p>	<p>Quality of infrastructure</p> <ul style="list-style-type: none"> • Telecom and network, real estate, transportation & power <p>Talent</p> <ul style="list-style-type: none"> • Availability, suitability, willingness, accessibility & trainability <p>Cost</p> <ul style="list-style-type: none"> • Labor, infrastructure & tax <p>Market Maturity</p> <ul style="list-style-type: none"> • IT/ITES employees as a percentage of total service sector employment • IT/ITES as a percentage of services GDP • Presence of industry association <p>Risk profile</p> <ul style="list-style-type: none"> • Regulatory, country investment, data protection <p>Other incentives</p> <p>Environment</p> <ul style="list-style-type: none"> • Government support • Business and living environment • Accessibility • Living environment

Source: World Bank, 2010.

4.06 The analysis will have to take into account that microwork and BPO have distinct differences in their structures and needs. The availability of employable skills remains the key

factor because both BPO and microwork are service-based, so the availability and quantity of skilled workers remains equally important, but the quality of skills differ. For microwork, soft skills (USDOL, 2012)⁷ are less relevant since workers do not need to interact or work in groups as much in BPO operations. Competitive cost remains a key factor, with labor costs being the most important cost factor, as both microwork and BPOs are driven largely by savings through arbitrage of labor costs across national borders. However, the cost of backbone connectivity infrastructure and office space becomes less relevant as microworkers need only the last mile access to Internet to work virtually from any location.

4.07 However, access to relevant infrastructure becomes less important in general for microwork. While Internet speed at the last mile is still critical for microworkers to work efficiently, the availability of reliable and redundancy in international connectivity is less critical as microwork does not typically involve mission-critical tasks requiring availability 24 x 7. There is limited need for class A office facilities given the remote nature of the work. Instead, personal and household access to computers and Internet is more relevant as they are the basic platforms needed to perform microwork. The availability of publicly accessible and shared infrastructure for remote work, such as cyber cafés and university-shared computing facilities are important to microworkers without personal access to modern computer equipment and high-speed Internet connection. For new microworkers, the physical location (with other microworkers) could be a support point.

4.08 Finally, the enabling environment (in terms of country context, regulatory framework and industrial policy, etc.) is less important due to the informal nature of microwork. This is because international aggregators do not need to be concerned about investing vast resources into the country, and are not subject to most of the local laws (such as company registration, set up and taxation). Industry policies, living environment, and physical accessibility also become largely irrelevant as most international aggregators have their main operations outside the workers' country. However national labor laws may be a consideration as aggregators may be subject to these laws, given that they contract masses of crowdsourced workers from the host country.

5. COMPETITIVE ANALYSIS

5.01 The analyses use the compiling of pros and cons, SWOT, and economic analysis as decision making techniques to assess feasibility. It relies significantly on both primary and secondary data, which have been incorporated into the analyses. To the extent possible and as needed the data covers PT aggregates, and a breakdown of demographics of population centers/governorates.

⁷ There is varying understanding of soft skills. Here it refers to the skills indicated by the United States Department of Labor, which includes professionalism and work ethic, oral and written communication, teamwork and collaboration skills, and critical thinking or problem-solving skills.

Pros and Cons

5.02 Pros

- Microwork can be promising in terms of contributing to economic growth for developing countries, and providing much needed income and mass employment for disadvantaged youth and women as: (a) it can be performed anywhere through commonly available computers and Internet connection, (b) has low barriers to entry through open and informal access to virtual tasks, and (c) offers high flexibility in skills requirements, and time and geographic arrangements. For example, Somali refugees in Kenya were able to earn money as microworkers after being trained by Samasource (a nonprofit aggregator), even though the refugees have never seen a computer (BBC News, 2011).
- Through microwork companies can greatly expand their access to human resources in a flexible and timely manner without increasing the number of staff and most associated fixed costs.
- Microwork can be a partial substitution for traditional digital BPO services in terms of outsourcing less complex tasks. It can help to expand the market because microtasks are often not economically feasible without the infrastructure of existing microwork aggregators (infoDev, 2011).
- Some leading technology companies, such as Amazon, eBay, and Intuit are already using microwork as part of their business processes. Companies in other industries, such as insurance and document archival, have only recently started some pilot projects.
- For PT, microwork has significant potential for reducing high unemployment and underemployment of youth and women due to its ease of entry, flexibility in skills requirements, and ability to overcome the movement and access restrictions in the Territories. Microwork can be a significant channel for youth empowerment through employment by providing a channel to earn and work as they prefer.

5.03 Cons

- The regulatory framework over crowd labor remains almost entirely unregulated or complicated. *“Courts and regulatory agencies have yet to apply existing employment and labor laws; and legislature have taken no action to extend those laws or otherwise regulated crowd sourcing.”* (Felstiner, 2011). Adding workers from new countries is challenging and slow as each country may have differing labor laws that need to be followed, some of which could be detrimental to the operations of these aggregators. For example, in the area of self-employment, some countries in the European Union have labor laws on part-time or freelance employees which may lead automatically to permanent positions, or the obligation for employers to pay full-time employment benefits to part-time workers. This increases the companies’ legal risk and may increase financial obligations if such factors are not addressed. This regulatory issue also creates opportunities for aggregators to offer terms that may be unfavorable to microworkers.

For example, AMT contains no opportunity or procedure for negotiation; and Amazon's terms of use, to which both parties agree, functions as the transaction's sole governing document. The contractual terms assert that microworkers will perform services as independent contractors, and not as employees. However this issue can be effectively mitigated through the use of local intermediaries.

- Crowd workers are paid low wages, are given no benefits, have no job security, and have little prospect to organize to change these conditions.
- Similar to an assembly-line for knowledge work, microwork can be seen as an extension of the division of labor and mass production. Microwork aggregation risks dehumanizing the worker due to its simple and repetitive tasks and relative distance between the job provider and the worker.
- If workers are required to provide the basic infrastructure for microwork, such a computer or mobile phone, they may face constraints in fulfilling their work due to low bandwidth or lack of connectivity.
- Inadequate payment platforms and high transaction costs may limit the frequency and volume of disbursement of payments to workers, which may impose high costs on microwork participation for both clients and workers. Due to the transaction cost involved in adding country workers, aggregators will also likely implement the typical direct crowdsourcing schema only for highly populated nations like China, India, Pakistan, Nigeria, etc.
- Firms may also encounter intellectual property risks through distributing microtasks to a widely dispersed set of workers. Employers can attempt to design their requests to protect any proprietary material, but a crowd worker may still be able to glean knowledge of a valuable piece of intellectual property by completing even a small task. Therefore crowdsourcing vendors often impose privacy or nondisclosure policies as part of their agreement with the worker. In addition, workers often disclose personal information to the microwork aggregator without a clear guarantee of confidentiality or responsible use. The extent to which this risk become prohibitive will depend on the size and structure of the firm, as well as the nature of the work performed (Felstiner, 2011).

SWOT Analysis

5.04 The SWOT analysis is conducted using the analysis framework described above. It examines the strengths, weaknesses, opportunities and threats from the perspective of availability of employable skills, competitive costs, access to relevant infrastructure, and enabling environment. The analysis is also based on the primary data collected during the team's mission to PT, and on secondary data collected from desktop research.

Strengths

Availability of Employable Skills

5.05 PT benefits from demographic characteristics that position it well in terms of labor quantity for microwork. In 2011, 66 percent of its population was below the age of 24 (PCBS,

2011b), which is the segment the population most likely the first adopt and use technology. The quality of available labor is also relatively high, as PT benefits from high literacy rate of 94.7 percent and high secondary and tertiary education rates. In 2009, available statistics showed that 45.4 percent of the youth (15 to 29 years) were enrolled in school, distributed to 86.5 percent among the age group (15 to 17 years), 50.9 percent among the age group (18 to 22 years) and 11.6 percent among the age group (23 to 29 years) (PCBS, 2010). At the University of Hebron's Faculty of Computer Science 75 percent of students are female). In a population center outside Ramallah, underemployed and unemployed skilled women who are unable to relocate for work are a valuable source of labor for microwork.

5.06 The Territories' young people are tech-savvy. In 2011, 39.4 percent of individuals (10 years and over) used the Internet in the Palestinian Territory: 44.3 percent of males and 34.3 percent of females. This is further underscored by a relatively high level of Facebook penetration of 35 percent (SocialBreaker, 2012)

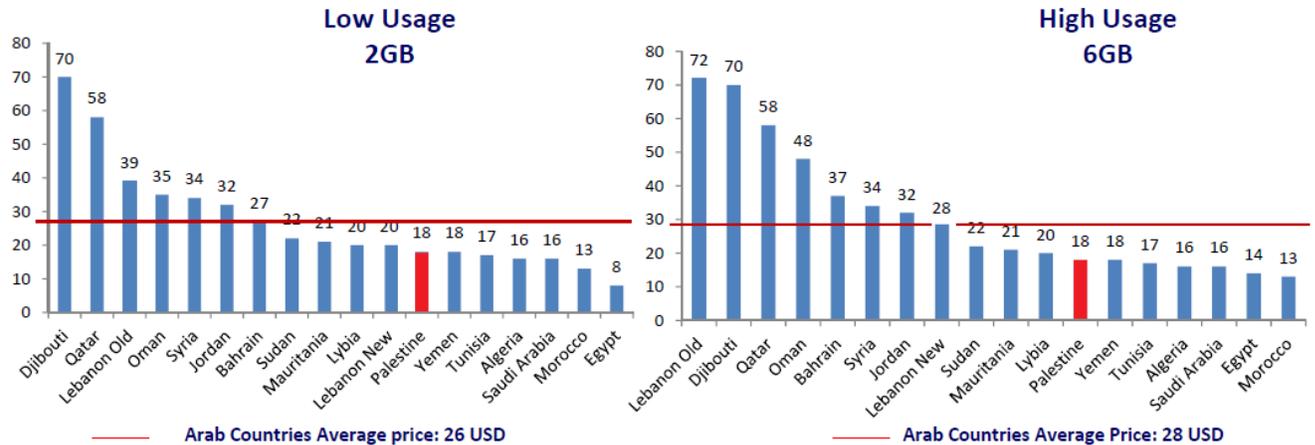
5.07 Palestinians have a regional advantage of advanced English language skills. This language skill is pertinent as most microwork platforms and task instructions are in English. These forms part of global demand for translation and Arabization-related microwork. An estimated 60 percent of Palestinians in the Territories read and write English (at least) at the intermediate level, and speak English at a basic/intermediate level. English is taught from the first grade; so by graduation students have had 12 years of English classes. According to the biggest English training center in the Palestinian areas, Amideast, recent university graduates or high school graduates from PT attain the highest average level of English competency in the region. Sharek, the Palestinian youth organization, stated in their 2011 published study "*the success factors in finding a job*" that 70.5 percent of the sample surveyed (recent graduates looking for a job) stated that they are proficient in the English language (speaking, reading, and writing). This emphasis is intended to provide high-school graduates with a higher level of competence in English to achieve two aims: to expose students to world culture where English dominates, and to make the students more competitive in the global labor market.

5.08 Palestinian youth are educated and a large percentage of university students study IT and engineering, which increases their competitive advantage to work with technology. In 2007, 17 percent of university students in the West Bank studied IT and engineering, and 8 percent in Gaza. In 2012, IT architecture and engineering are the most popular courses. Palestinians' IT skills include website development, mobile applications, software development in languages such as .net, Java and PHP tools, gaming and animation, backend systems. In addition, other courses popular with Palestinian students are architecture and civil engineering, which provide the foundation for increasingly sought after 3D modeling, and microtasks in this area (PCBS, 2011).

Competitive Costs

5.09 The cost for access to Internet or broadband is relatively competitive from a regional perspective. For example, prices of residential ADSL (a communications technology used for connecting to the Internet) are relatively low compared to its neighboring countries (Figure 9); including Jordan and Lebanon (TRA, 2011).

**Figure 9: Residential Fixed Broadband Basket
256Kbps ≤ Low Speed OECD Basket < 2.5Mbps
(USD; VAT inclusive)**



Source: TRA, 2011.

5.10 The cost of transferring micropayments within PT is low, as the costs for setting up a bank account and for domestic fund transfer appear to be competitive.⁸ Wataniya Mobile has introduced an intentional mobile credit transfer system, which may be used to transfer small value compensation to Wataniya subscribers, thereby serving as a possible local micropayment platform.

Access to Relevant Infrastructure

5.11 Palestinian youth and women appear to have ready access to the needed computers and Internet for microwork. In 2011, 50.9 percent of households had a computer, 30.4 percent of households had Internet connection (15.3 percent with broadband), 95 percent of households had a mobile phone (PCBS, 2011b). In addition 53.7 percent of individuals (10 years and over) in the Palestinian Territory have access to computer: 54.8 percent in the West Bank and 51.7 percent in Gaza Strip: and 58.5 percent of males and 48.7 percent of females. There is also a 72.6 percent mobile penetration (ITU, 2012), and all universities are equipped with computers and Internet access. PT also benefits from a high penetration of bank branches and post offices for local micropayment disbursement to microworkers. In Gaza, there are 44 bank branches and there is no need for proof of employment to open a bank account⁹.

⁸ Bank Fees according to the official Palestine Monetary Authority regulations dated October 18, 2011. The fees are based on the amount transferred, and the corresponding amounts and costs are: (a) up to \$3,000 = \$4, (b) up to \$20,000 = \$10, up to \$100,000 = \$30, more than \$100,000 = 0.05 percent of the transferred amount. However, additional charges may be added as domestic transfers have to use SWIFT in PT. This fee may differ between banks but on an average it is between \$4 and \$10 per transaction. Hence charges for a \$3,000 transfer, for example, are between \$8 and \$14 in total.

⁹ Based on authors' interview with PMA.

Enabling Environment

5.12 Palestinian youth are familiar with using the computers and Internet. For computers the data reported in 2009 show that the proportion of young people who own a computer has reached 87.9 percent in the Palestinian Territory (87.4 percent in the West Bank and 88.6 percent in Gaza Strip), compared with 47.6 percent in 2004 at the level of the Palestinian Territory. The gap in the use of computers between males and females had narrowed. In 2009 the use of computers among males reached 91.0 percent compared to 84.4 percent for females. 46.7 percent of young people also used the Internet in the Palestinian Territory in 2009 (49.2 percent in the West Bank and 42.8 percent in Gaza Strip) compared with 20.3 percent used the Internet at the level of the Palestinian Territory in 2004. However the ratio between males and females in the use of the Internet varies significantly (53.0 percent for males and females 40.2 percent). In the Palestinian Territory in 2009, 32.9 percent of youth had email accounts (36.0 percent in the West Bank and 27.9 percent in Gaza Strip), compared with 2004 when 14.3 percent had email accounts. Gender-wise, in 2009, 40.9 percent of males had email accounts compared to 24.5 percent of females with email accounts (PCBS, 2010).

5.13 Palestinian labor and tax laws have no specific restrictions and do not appear onerous for microwork. There is no minimum wage law, but one is being negotiated. International aggregators or intermediaries also face limited risks in terms of having to pay full-time employment benefits to part-time microworkers, as employees in PT are only entitled to benefits if they work full-time or part-time for at least two years continuously, and perform their work under supervision.¹⁰ However this should be confirmed through a legal analysis; and international aggregators are expected to remain concerned about their exposure and compliance to local labor laws. The PA's tax laws also do not appear to present major roadblocks, as there is a minimum amount of earnings before taxes applies, and tracking of microworkers as tax payers could be done through a local microwork intermediary.

Weaknesses

Availability of Employable Skills

5.14 PT's potential labor force for microwork is dwarfed significantly by competitor countries with significantly larger populations, such as Egypt, India, and Nigeria. This reduces its attractiveness for entry by international aggregators.

5.15 The ability of Palestinian young people to speak English is weaker than their ability to write in English. According to Amideast, the major challenge lies in understanding the spoken language rather than in reading English; and the task team observed this in interviews with young people. Concurrently, Palestinian youth have relatively weak soft skills—particularly in areas such as marketing, and customer service. However soft skills are not particularly relevant for microwork as there is limited interaction and teamwork required.

¹⁰ Based on authors' interview with PA's Ministry of Labor.

Competitive Costs

5.16 The relatively high labor cost appears to be the key impediment for microwork in PT. As illustrated in Table 5, the average daily wage across the Territories is 102.9 NIS (\$27.45);¹¹ which is generally higher than competitor countries across the world; such as Bangladesh, China, Egypt, India, and Jordan (ILO, 2010).¹² These wage rates are supported via interviews with universities and local companies and suggests that the minimum acceptable wage rate for university graduates in West Bank is at the minimum of \$3 per hour (\$24 per day),¹³ which makes simple and lower-paying microtask challenging for PT. The PA has also recently passed a measure that established a wage of 1,450 NIS per month (\$387.41), which is estimated at 8.24 (\$2.20) per hour.

Table 5: Average Daily Wage in NIS for Graduates by Specialization and Region¹⁴

Specialization	معدل الأجر اليومي بالدينار حسب المنطقة Average Daily Wage by Region		
	قطاع غزة Gaza Strip	الضفة الغربية West Bank	الأراضي الفلسطينية Palestinian Territory
Education Science and Teacher Rehabilitation	69.3	94.5	87.5
Humanities	82.5	107.9	99.1
Social and Behavioral Science	87.7	107.3	102.0
Mass media and Information	63.6	108.7	90.9
Business and Administration	74.9	114.0	104.2
Law	-	152.1	134.9
Natural Sciences	112.9	105.4	107.5
Mathematics and Statistics	96.9	100.2	99.1
Computer	73.3	100.0	95.3
Engineering and Engineering Occupations	85.4	125.7	117.0
Architectural and Construction	84.9	145.9	129.4
Health	85.2	115.0	104.1
Personal Services	80.6	100.8	92.6
Other Specialization	91.9	106.8	102.6
Total	82.7	111.2	102.9

Source: PCBS, 2011a.

5.17 Undergraduates in the West Bank University appear to have unrealistic expectations for wages; during primary interviews, they quoted rates of \$5 to \$15 per hour. However the interviews with universities and youth-oriented NGOs also suggest that this youth demographic typically adjust their wage expectations to a more realistic level after graduation and when

¹¹ Converted based on a rate of \$1 to 3.748 NIS; provided by www.oanda.com and accessed on April 28, 2012.

¹² In Jordan, the hourly wage for a clerk or service worker ranged between \$1.16 and \$1.43, and for professionals between \$2.32 and \$3.49 in 2008.

¹³ Based on interviews with universities' administration and REACH (a local call center employing around 800 agents). The \$3 per hour rate from REACH is expected to be particularly indicative as it is the average rate they offer to their employees with university qualifications.

¹⁴ Graduates refer to those who hold Associate Diploma Certificate and above.

unemployment becomes a stark reality. High-school graduates may have a lower wage expectation feasible for lower-paying microtasks.

Access to Relevant Infrastructure

5.18 There is no cost-effective mechanism for international micropayments to Palestinians, such as PayPal or international mobile banking. This makes it infeasible for most Palestinians to perform microwork online as the transaction costs for receiving their micropayments is prohibitive. Palestinian youth (especially women) also face some constraints in public access to computers and Internet, despite the relatively high availability of relevant infrastructure. Universities could provide the required ICT infrastructure and are appropriate locations for both men and women to work on microtasks and other virtual work, but they are accessible for limited hours per day and are subject to the academic term. There is also a high penetration of Internet cafés, but it is not culturally appropriate for women and girls to visit such establishments. This increases the emphasis on readily available ICT tools that microworkers can use at home, particularly for the female population. Moreover, mobile broadband is limited as Palestinian mobile network operators currently do not have 3G licenses, unlike their Israeli counterparts, and this poses limitations to the use of mobile phones as a device for microwork.

Enabling Environment

5.19 It is risky and burdensome for United States-based aggregators to transfer funds to PT institutions or individuals, especially to Gaza, as the Territories is subject to United States' laws designed to prevent the financing of terrorist activities. If there is a financial transfer from the United States, transferees need to be vetted to ensure full compliance with antiterrorism financing rules, which can delay payment disbursement; and the transferor's (e.g., United States-based aggregator) operations could be halted by law if it is found guilty of breaking the law. Based on examples of the Mercy Corps' pilot and other internationally funded projects in PT, the transfer and release of payment may take up to 40 days and are subject to significant fee deductions. There is also a very poor perception of PT's security situation due to ongoing occupation and related violence.

Opportunities

Availability of Employable Skills

5.20 The high unemployment and under-employment among educated youth and women provide an opportunity for a significant microwork labor pool, both from a full- and part-time microwork perspective. In addition there is a relatively large and untapped pool of Palestinian women for microwork, as women with post-secondary education face unemployment rates higher than 30 percent, more than double the rate for men with the same education level. Moreover, it is educated women who face long spells of unemployment—more than 70 percent of women with secondary education and more than 80 percent of those with post-secondary education have been unemployed for more than a year. It is also common for women with high school or university qualifications to become homemakers and not be part of the labor

market, hence microwork offers these women the opportunity to work from home in under flexible conditions.

Competitive Costs

5.21 Although Palestinian labor costs are not competitive in general, microwork's ability to add to discretionary incomes of the large unemployed and underemployed labor pool could result in significant interest from youth and women. It is also on this basis that microwork is about to attract significant number of workers in high labor cost countries, such as the United States and European countries. Microwork's flexible employment conditions could be attractive to masses of educated female homemakers; as it enables them work from home, have a flexible time schedule, and choose from a diverse range of microtasks. In addition, Palestinian youth with high-school qualifications may have a lower wage expectation, making microwork more of an option for employment.

5.22 Gaza's lower wage rates are expected to make microwork more feasible from a cost perspective. Based on Table 5 the wage rate is estimated to be 26 percent lower (82.7 versus 111.2 NIS per day) in Gaza than in West Bank, which positions Gaza more competitively than West Bank for microwork. However other challenges exist related to movement and access, and international funds transfer.

Access to Relevant Infrastructure

5.23 Various physical infrastructures are possible for microwork. Universities in most cities have IT centers of excellence with computers and broadband Internet access that are available to students. In the case of an-Najah University and the Palestinian Polytechnic University, managers of the centers indicated these facilities can be used for microwork training and tasking. The Palestine Information and Communications Technology Incubator had also offered to open its premises for such purposes, and the outsourcing center, REACH, suggested that their center and employees could be used for microwork during off-peak call hours.

Enabling Environment

5.24 During interviews, local stakeholders (universities, NGOs, industry associations and IT companies) expressed their interest to be intermediaries in the microtask process. This keen level of interest is encouraging as PT is likely to need an intermediary for microwork to be feasible; due to issues related to international micropayment mechanisms, United States' laws designed to prevent the financing of terrorist activities, and security perception.

5.25 The Palestinian Monetary Authority is negotiating the introduction of mobile banking in PT based on an interoperable platform that includes all banks and mobile operators in 2013. Such a mobile banking system would significantly facilitate the transfer of frequent and small value cash transfer for microworkers; but its introduction could take significant time and effort as such services may be subject to the alignment of PT's finance and telecommunications industries' interest.

5.26 Microwork is being tested in PT and a pilot for microwork was conducted for social media advertising organized Mercy Corps, an international NGO, which provided training to a group of Palestinian youth, and this training and exposure provides a foundation for microwork in this area. However this is aimed at higher-end microwork for optimizing Google AdWords campaigns, and is focused solely on university graduates/undergraduates.

Threats

Availability of Employable Skills

5.27 The unrealistic expectations of university undergraduates in terms of wages per hour could significantly reduce their sustainability as microworkers. The students claimed that they would only undertake microwork if it did not interfere with their studies and/or performance in examinations.

Competitive Costs

5.28 Due to lower labor costs, PT's market *niche* will have to be carefully defined to ensure global competitiveness. If Egypt and Jordan introduce microwork, they could capture its regional demand, depending on the types of microtasks that are introduced in PT.

Access to Relevant Infrastructure

5.29 The use of universities as shared facilities for microwork is subject to uncertainties, as they may close for short or extended periods due to labor disputes or political feuds, which may limit microworkers' access to ICT infrastructure. The Gaza Strip also experiences frequent power failures, which can disrupt virtual employment processes. In addition, as all Palestinian Internet connections are accessed through the Israeli gateway, and Israel can limit or halt the access to Internet, should it choose to do so for reasons of security.

Enabling Environment

5.30 Representatives of the PT's private sector interviewed by the authors underscored the challenges of attracting foreign investment and clients due to a perception of security issues related to the to the Israeli-Palestinian conflict. They emphasized the importance of leveraging Palestinian diasporas to mitigate this risk, and the support the growth of private enterprise, including microwork and virtual employment.

Economic and Social Impact Analysis

Economic

5.31 A simplified economic analysis was conducted to assess the potential impact of microwork, in terms of potential employment creation and total industry contribution to the local economy. It assumes that all employment is for part-time employees (PTEs) only, and the analysis uses the number of direct full-time employees (FTEs) in PT's ICT sector as a

benchmark to estimate the number of PTEs that will participate in microwork since ICT is a closely associated sector (in 2008 there were 5,200 FTEs in the ICT). This approach is conservative as it does not take into account indirect employment; even though estimates have shown that each direct job in the ICT sector is associated with three indirect jobs (PITA, 2009). The analysis uses four hours per week as the average time that Palestinian youth and women will spend on microwork. This is conservative as most microworkers spend four to eight hours per week on AMT (Ipeirotis, 2010), and actual participation is expected to be higher in specialized platforms as discussed above. The estimated industry growth rate is based on a normal distribution curve, and the microwork PTE growth per year is derived from this curve. The percentage used for calculating the industry’s added value is based on the average of the services industry in PT (PITA, 2009). The analysis uses a discount rate of 7.41 percent per year as an average for the net present value (NPV) calculations, and this is based on the five-year average of the local banks’ lending rates from 2007 to 2011 (IMF, 2012).¹⁵ The analysis uses a \$2 per hour earning assumption for simple microtasks, which is realistic based on international experiences—each microworker’s earning is calculated at \$8 a week.

5.32 Annex III’s Table A and B show the estimated economic impact of microwork based on this approach and assumptions. Table A assumes that the number of microworkers will reach to only 20 percent of those in the ICT sector in five years. This will translate to employment for 21,840 PTEs, earnings of \$9.35 million for Palestinian microworkers and an industry value add of \$4.57 million in terms of NPV. Table B assumes that the number of microworkers will reach up to 50 percent of those in the ICT sector in five years; and this translates to 54,600 PTEs, earnings of \$23.38 million, and an industry value add of \$11.43 million. These assumptions on percentage employment as benchmarked to the ICT sector is assessed as conservative, given that microwork is a significantly easier industry to enter for employment, and requires much lower level of skills for the \$2 per hour microtasks. The results are summarized in Table 6.

Table 6. Summary of Results from Economic Analysis

Employment in 5 years (as percentage of ICT sector employment, in equivalent PTEs)	Number of Microwork PTEs	Total Earnings by Palestinian Microworkers (\$ million)	Industry Value Add (NPV) (\$ million)
20	21,840	\$9.35	\$4.57
50	54,600	\$23.38	\$11.43

Social

5.33 Microwork can result in notable social impact based on existing assessments. However its impact has not been widely documented as it is still an emerging area of virtual employment, and there is need to monitor and evaluate microwork’s direct and indirect benefits, as well its negative ramifications.

5.34 Documented cases of microwork show significant social impact, such as access to employment for the poor and disadvantaged segments of the population, increased computer

¹⁵ Data for 2007 to 2008 are actuals, for 2009 is estimated, and for 2010 and 2011 are forecasted.

and communication skills, increased confidence and status within households and communities, particularly for women. In rural India one study uses Sen's capability approach as the theoretical framework to assess its contribution towards human development (Sharanappa, 2011). It found that microwork has the potential to create valuable employment for large numbers of people living in poverty, and make a positive impact on their capabilities. Microwork was found to have directly impacted workers by broadening their mindsets to new ideas due to computer skills acquired, and language training received, and exposure to new types of work. It has given workers confidence in their abilities, dignity, and self-respect. From the affiliation perspective of Sen's framework; microwork gives workers opportunities to interact and work with people from different backgrounds and villages, and imparted a sense of increased control over their environment. Women found that their influence over purchasing decisions increased within their families and felt more confident as their skills developed to assist their children in their studies.

5.35 Microwork provides the worker an opportunity to use (otherwise) idle time to earn discretionary income: Twenty-one percent of surveyed microworkers from Amazon Mechanical Turk stated "to kill time" as one of their reasons for taking on microtasks through the aggregator and a larger percentage (34 percent) listed "pocket change/extra cash", compared to 49 percent who listed purely "income purposes" (Ipeirotis, 2008). Another potential impact of microwork is that it gives microworkers the incentive to be more present online and develop computer and digital communications skills, which can increase their participation in social networks (Facebook, LinkedIn, etc) and allow them to build their online reputations, an aspect that is "vital to having a voice in the modern world" (Janah, ~2006).

5.36 Microwork may have negative social implications, particularly if labor conditions, dispute resolution, and payment processes are unregulated and unmonitored (Felstiner, 2011)—these may reduce the microworkers' control over their environment, and subject them to exploitation by a virtual employer through nonpayment or information asymmetry, negatively impact their social affiliations and family relationships, or professional development (Sharanappa, 2011).

5.37 As discussed in the pros and cons section, microwork can be a form of virtual division of labor and mass production. There have been long-standing debates about division of labor and mass production; and these have been acknowledged and praised as the source of wealth to nations, and seen as inhuman and demeaning in nature (Ukpere, 2010). Microwork presents the risk of dehumanizing labor, particularly through the volume of workers and their distance from their employers. It may also isolate workers within their own communities, as they work alone on computers instead of on teams with shared physical space. As microworkers may not know or have direct interaction with their employer, microworkers have limited means to verify if they are involved in legitimate activities and resolve any disputes over their work, or any intellectual property and compensation (Felstiner, 2011). Lastly, a worker performing one form of basic task over time experiences limited intellectual stimulation, and skills development; if not degradation, combined with diminished motivation (Howe, 2006b).

6. FINDINGS, CONCLUSION AND RECOMMENDATIONS

Key Findings

1. **There is a readily available, skilled, and accessible youth workforce for microwork.** This is generally due to the high unemployment and underemployment (especially for women); English language skills; familiarity with using the Internet; and ready access to the necessary computers and Internet for microwork. The ability to overcome restrictions on access and movement could be a major attraction, especially for young women who are underemployed and homemakers.
2. **Palestinian youth have adequate access to computers and Internet for microwork in general.** However supporting programs could maximize use of existing facilities such as university centers of excellence, cyber cafés, and relatively pervasive Wi-Fi access in public places. In addition any infrastructure support program should take into account the particular needs of women, since it is not be socially acceptable for them to use shared public facilities, or to stay late for work.
3. **PT has comparative advantage in limited types of microtasks, and this is largely due to its relatively high labor costs in comparison to international competitors.** Table 7 provides a conceptual overview of the competitiveness of PT in various microwork segments (A to D); and shows that PT is uncompetitive in the most common types of microtask, because Palestinian’s average wage rates are above the market rates for such work. However these costs are not prohibitively high as there are microtasks that pay higher wages, especially those that require advanced skills and are regional/language specific.

Table 7. Estimated Competitiveness of PT in Microwork Segments¹⁶

Type of Work	Likely Competitors	Task-Complexity / Skill Level Required	PT Competitiveness Rankings
Segment A			
Translation from English to Arabic	Low competition as only Jordan has access to a similarly educated pool of bilingual workers	High	High. This segment has great growth prospects and PT is in a relatively unique position to provide excellent quality
Copyediting in Arabic	Other Arabic-speaking countries, in particular low-wage but their workers may lack the required skill-sets	High	High. This is one of the dominant crowdsourced task types in micro-work
Segment B			
Proof reading of Arabic language	Other Arabic-speaking countries, in particular low-	High (typically difficult due to complex rules of grammar,	Medium. Could be a dominant specialization for PT given

¹⁶ This table provides a sample selection of the relatively more relevant and lucrative task types only, and is not meant to be a complete representative of all. The table’s estimates and assessment based on the opinions of subject experts and the authors only, and this is largely due to the lack of relevant secondary data in this new industry. The table deliberately excludes microtask types that may be ethically questionable (e.g., creating artificial twitter-followers, Facebook-likes, fake reviews, pseudo backlinks, etc. Refer also to <http://www.cs.ucsb.edu/~bowlin/pdf/crowdturfing-www12.pdf>). It also excludes some premature task types (e.g., extracting meaning/meta-data from doctors’ prescriptions, or codifying scientific literature) as their growth appears uncertain at this time. The rating for task complexity/skill level required is based on estimates of the percentage of Facebook literate microworker who can deliver the task; and the corresponding rating is 80 percent for “low,” 30 percent for “medium,” and 10 percent or less for “high.”

Type of Work	Likely Competitors	Task-Complexity / Skill Level Required	PT Competitiveness Rankings
	wage but their workers may lack the required skill-sets	vocabulary, and intention)	appropriate industry development support
Image recognition	Typically language independent**	Low to high, as there is a spectrum of various complexity levels	Medium. An important growth segment, but competition is expected to be high as it is language independent
E-Commercial product analysis (in Arabic language)	All other Arabic-speaking countries, in particular low-wage	Medium to high	Medium. An important segment, but low-wage Arabic nations may have an edge in the long-term
Segment C			
3D modeling/animation (typically for e-lancing)	International competitors	High, as this requires special training and skills	Low – medium. Depends significantly on the amount of industry development support
Logo and graphics design (99design and crowdspring; typically for e-lancing)	International competitors	High. As it requires talented workers to produce excellent designs, and such workers may come from different segments of a population	Low – medium. Depends significantly on the amount of industry development support
Segment D			
Image cropping	Language independent**	Medium. Most Internet-literate workers should be able to perform if provided sufficient training	Low. Already executed by highly established players in India and other regions in Southeast Asia
Content moderation (typically image, text, and video classification)	International competitors, and Arabic nations only for Textual Arabic	Low to high	Low. For images (e.g. image recognition) and text as English skills are more competitive in Asia, especially in India
Usability testing for Arabic websites and software (e.g., uTest.com, feedbackarmy.com)	All Arabic countries	Low. The exact intent is to ask low-skilled workers about their opinion regarding a websites or software usability	Low. Such work targets low IT-skilled workers about their opinion, e.g., Egyptians, Gulf States
Audio transcription of Arabic language	All other Arabic-speaking countries, in particular those with low-wage rates	High	Low.
Text sentiment analysis of social media (e.g., AMT and CrowdFlower)	International competitors, and Arabic nations for Arabic written text	Medium to high. Fast readers are required	Low as competition is high

Source: By Authors

4. **PT’s strongest area of comparative advantage is in microtasks that use the English and Arabic language pair, due to Palestinians’ high level of English proficiency in comparison to other Arabic speaking countries.** Examples of such microtasks are English-to-Arabic translations, and copyediting in Arabic (Segment A). PT is moderately competitive in other microtask that requires Arabic proficiency, as Arabic-speaking countries are also able to take up such tasks, and likely at a lower wage rate than PT (Segment B).

5. **PT may be able to compete in these mass microwork market consisting of simpler and lower-paying microtasks, as Palestinian youth and women may be willing to accept a lower hourly wage rate for such work on a casual or part-time basis, and be paid a premium above the minimum wage rate for quality output.** Examples include those rated as “low” in competitiveness; such as image cropping, content moderation, usability testing, and text sentiment analysis/opinion mining of social media (Segment C). PT may be able to compete in these microtasks because

microwork offers a unique value proposition that other industries are unlikely about to offer. These simple microtasks can be conveniently accessed and performed by Palestinian youth due to their relatively high skills, ready access to infrastructure, and unemployment/ underemployment situation. Microwork offers youth the opportunity to overcome the unique restrictions to movement and access, and it could be interesting to Palestinian homemakers and the underemployed. More important is microwork's effect on discretionary income as it could sufficiently motivate Palestinians youth and women; as much as it had motivated individuals from more developed countries (e.g., the United States and countries in the European Union) to become microworkers, even though microwork pays far below their countries' average wage rates. This is because every dollar earned can contribute directly to their discretionary income, but their willingness to take on such tasks is difficult to estimate as it depends largely on cultural and personal preferences. It is expected that surveys and interviews do not provide a reliable estimate of such willingness, as microwork is a completely unknown and new phenomena for most Palestinian youth and women.

The global microwork industry pays a premium for quality outputs and one of its key challenges is to distinguish capable and responsible workers from the vast global pool. Therefore, Palestinian microworkers could be aggregated and managed locally to provide quality outputs, and develop their global reputation as a capable and responsible workforce.

6. **PT may also be able to compete in tasks that border the microwork and e-lancing space.** This includes the “macrotasks” (Segment D), such as 3D modeling or animation, and logo and graphics design; as they can offer higher wage rates. However this segment is also highly competitive and requires specialized skills.
7. **Microwork is expected to be more feasible in population centers outside Ramallah, largely due to the wage and standard of living differentials that exist.** Hence it is expected to be more feasible in centers such as Gaza City, Hebron, and Nablus.
8. **For microwork to be feasible PT should target specific demographics as potential microworkers.** For example, women should be targeted due to their generally higher unemployment and underemployment rates. Lower-end microwork is also expected to be more feasible for youth and women with lower levels of education. This is because work on the lower-end *niche* segments, such as content moderation, usability testing and audio transcription, can typically be done by microworkers with a high-school education. They have lower expectations for wages than their university-educated peers. Therefore, the targeted demographics could include female homemakers, underemployed youth, men and women, and students at university levels. Table 8 shows the possible demographics that could be targeted by the types of microtask types.

Table 8. Target Demographics by Types of Microtasks

Complexity	Types of Microtasks	Demographic
Low	Content moderation, and Arabic usability testing and audio transcription	<ul style="list-style-type: none"> • Unemployed high school graduates • Female homemakers
Medium	E-commercial product analysis (Arabic), logo and graphics design, 3D modeling/animation	<ul style="list-style-type: none"> • Unemployed or underemployed tertiary graduates from various disciplines related to art and design • Female homemakers • Tertiary undergraduates from similar disciplines as above; and need additional income/financial assistance or seek practical experience
High	<i>Translation from English to Arabic, copy editing and proof reading in Arabic</i>	<ul style="list-style-type: none"> • Unemployed or underemployed tertiary graduates from disciplines requiring extensive work in English (e.g., business, humanities and arts, social science, etc.) • Tertiary undergraduates from similar disciplines as above; and need additional income/financial assistance or seek practical experience

Source: By Authors.

9. **There is a need to use microwork intermediaries (as opposed to using a direct model) in PT to overcome the key challenges in PT and add value to the industry; and international experiences can be leveraged for this purpose.** This is because intermediaries are needed to facilitate local micropayments to workers, since PT does not have a cost-effective payment platform for international micropayments. The intermediary can receive consolidated international fund transfers for their Palestinian microworkers, and coordinate the micropayment within PT using existing local banks and/or post offices. This micropayment set-up enables a lower transaction cost (e.g., using money brokers with expertise in international payments for PT)¹⁷ as payment is made in bulk to the Palestinian intermediary, then transferred domestically to masses of microworkers.

The intermediary could also reduce the local microworkers' risk of delayed payment. This is because only the intermediary receiving the international transfers and have to be vetted for compliance under United States' laws designed to prevent the financing of terrorist activities, instead of having to vet all Palestinian microworker for compliance. Such an intermediary could also delink international aggregators' from the risk of Palestinian labor laws since the microworkers will be contracted by the intermediary rather than the international aggregator. As discussed above liability from local labor laws is a common concern for international aggregators, and the relatively small size of the Palestinian population may not warrant efforts to examine the legal risks for PT.

From an operational perspective the intermediary could add significant value to a microwork industry in PT. It could provide a platform customized to the needs of local microworkers (e.g., CloudFactory and MobileWorks). The platform could be in Arabic, and transform tasks to the appropriate complexity to local microworkers. The intermediaries may also perform the business development role of acquiring international

¹⁷ MercyCorp ongoing project in PT uses an Israeli-American company to distribute the payments and conduct due diligence on workers to ensure compliance with antiterrorism laws. Their fee is less than 5 percent and they transfer directly to bank accounts. However transfers should not be less than \$100 a time to make it worthwhile from a transaction cost perspective.

microwork aggregators; as PT is unattractive for international aggregators due to the relatively limited size of the potential workforce as compared to large countries, and the unfavorable security perception of PT. Concurrently, such intermediaries can prevent PT from developing a large, unregulated, and informal sector that does not provide tax revenues to the government (given the need for sustainable public budgets). Intermediaries may also add value in the following ways:

- help to focus PT's industry development effort towards the *niche* types of microwork identified
- provide initial training, guidance, and trouble-shooting support for potential microworkers
- provide physical infrastructure and social environment for microworkers (especially women) to kick-off their microwork efforts
- provide a localized and simplified microwork platform for Palestinian microwork, in order to drive higher efficiency and effectiveness in doing microtasks
- enable closer monitoring of implementation and impact
- transform microtasks for the appropriate complexity for their workers
- provide networks or platforms for peer-to-peer support and guidance, such as virtual solidarity groups for control, transparency and microworkers' personal development (e.g., CloudFactory, MobileWorks, and Samasource)
- allow tracking of microworkers as formal workers and potential tax payers; as each worker will have to be contracted with and receive their payments through the intermediary.

10. However the intermediary's business and operational model should also be well-defined due to various possible combinations of form, structure, focus segments, location, demography, etc. (Section 3 of this study). For example it could be operated by the private sector, academia, and/or NGOs; as each types of institutions bring their own strengths and weaknesses as an intermediary. The intermediary could also use local or international aggregators' microwork platforms, focus on different microtask segments, be located in different population centers, work with particular demographics of Palestinian youth and women, etc. The intermediary may also be both the aggregator and service provider (e.g., CloudFactory), hence it may not add an additional layer of cost, and may not affect the earnings of Palestinian microworkers.

11. The economic analysis indicates that microwork could have significant employment impact for Palestinian youth and women, and provide much need industry value add to PT's economy. The analysis is conservative as it uses \$8 as earnings per week by each microworker, it does not account for the three indirect jobs for each direct job in the ICT sector, and it estimates the number of PTEs to be equivalent to only 20 or 50 percent of the direct jobs in the ICT sector after five years. However this analysis assumes that that Palestinian youth and women are willing to work for a lower wages of \$2 per hour, which is below the estimated \$3 per hour for full-time employment of university

graduates. This assumption will lead to exploring practically the willingness of women and youth to work for lower wages.

12. **The limited studies on microwork's social impact suggest that it is net positive for PT, but this should be examined further from a practical perspective.** The only study specific to microwork by Sharanappa (2011) seem to have found numerous positive impact from various social perspectives. However the possible social issues related to division of labor and mass production are part of the long-standing debates, and may have to be examined further from a contextual and practical perspective.

Conclusion

6.01 This analysis in the feasibility study suggests that microwork has significant potential to improve PT's employment, earnings of youth and women, and add value to industry; but there are differing possibilities to be examined. Palestinian microworkers appear to have relatively strong comparative advantage in English and Arabic related microtasks that can be costed at the local wage rates (Segment A), and moderately competitive in other Arabic-language related work (Segment B). In addition PT may be able to compete in the common, simple, and lower paying microtasks (Segment C); as the international experience suggests that workers from developed countries with higher wage structures are involved in microwork. Moreover there is an opportunity for youth and women to compete in macrotasks bordering e-lancing (Segment D).

6.02 The use of local intermediaries could address some of the main challenges for PT and add value to the industry, such as international micropayment mechanism, compliance with laws designed to prevent the financing of terrorist activities, and the perception of poor security conditions in PT. However microwork needs to be examined further to address various possible issues from a practical perspective, such as the willingness of Palestinians to work on the lower paying tasks that pay below the market rates; PT's actual competitiveness in various types of microtasks in the global market; and the most suitable business and operational model for local intermediaries.

6.03 PT will need to take actions to develop a microwork industry as it is not expected to grow organically. Numerous factors are likely to deter international aggregators from considering PT for microwork; including the relatively small size of the potential labor force and high labor cost, lack of feasible facilities for international micropayments, the burdensome due diligence on every Palestinian microworker due to laws designed to prevent the financing of terrorist activities for United States-based aggregators, and the perception of poor security conditions. PT must move quickly to compete for microwork, as other countries will also want to leverage the opportunity to develop and improve their socioeconomic status.

Recommendations

General

6.04 The recommendation is for PT to explore development of the microwork industry on a cautiously optimistic, limited, and selective basis. The approach should be on a cautiously optimistic basis because: (a) microwork is a relatively new business phenomenon, (b) country-level industry development has not been undertaken, and (c) there are many possibilities in terms of segments, geographies, demographics, and intermediary business models. The exploration could be done on a limited basis by conducting pilots to further confirm its viability; especially in terms of the international micropayment mechanisms, intermediaries' business and operational models, and Palestinian youth and women's willingness perform simple and lower paying tasks. PT should be selective in the exploration, and focus on identifying types of microtasks, population centers such as Gaza, Hebron, or Nablus, and target a demographic, such as women homemakers who are unemployed/underemployed.

6.05 Hence microwork's feasibility in PT's unique context will need to be tested in at least two pilots to address the possible mixes of issues described above (i.e., suitable business and operational models for intermediary, focus of population centers and demographics, youth and women's preferences and willingness to work on specific types of microtasks, etc.).

6.06 The proposed next step is to design and develop implementation plans for the pilots, facilitate partnerships between international aggregators and local intermediaries, and develop an M&E framework and plan for the pilots especially from a socioeconomic perspective. These pilots will need to be carefully designed to ensure that they are able to test (realistically, comprehensively and effectively) all the possible mix of issues; in addition to being able to promote the participation of women as microworkers. Moreover the next step should facilitate the set-up of partnerships between international aggregators and potential local intermediaries for the pilots, since formally setting up these partnerships can take more than six months. These next steps could include the provision of networking and matchmaking workshops in both West Bank and Gaza, and technical advice on set-up and operationalization of local intermediaries. In addition the next step should build an M&E framework and plan to assess microwork's socioeconomic impact in PT from a practical perspective.

Concept Strategy and Plan

6.07 A concept-level strategy and implementation plan is developed under this feasibility study to provide a high-level and general understanding of the next steps in the roadmap needed by PT for the development of its microwork industry. Both the plan and strategy are conceptual at this stage in the analysis, however, if the proposed pilots confirm microwork's feasibility for PT, the plan and strategy could be included as part of the short-term action plan.

Conceptual Strategy

6.08 The immediate-term strategic goal for PT is to have well-designed program for the piloting of microwork, facilitate networks and partnerships for the pilot intermediaries, and develop an appropriate M&E framework and plan. The short-term goal is to conduct pilots to confirm the suitable approach and structure for the development of the microwork industry; to validate PT's comparative advantages in the identified microtasks (Segment A), and explore Palestinian youth and women's interest in the mass, simple, and lower paying microtasks

(Segment C). If there is sufficient scope the two pilots could also explore the suitability of the other segments (Segments B and D) for PT. Concurrently the short-term goal is to address the possible risks of microwork with regards to micropayments, and tax and labor laws.

6.09 If, through the exploration and analysis, microwork is confirmed to be suitable for PT on a large-scale, then the medium- to long-term goals can be to:

- strengthen PT's value proposition in microtasks where it has comparative advantage, and plan to build a strong global reputation in such work;
- build PT's comparative advantage in the simpler and lower paying segments of microtasks, to build large-scale and sustainable employment of youth and women in PT; and
- in the long-term leverage microwork as a strategic and sustainable industry for PT's development, with regards to mass employment for youth and women, added value to industry, and economic growth.

6.10 The main strategic focus of the industry development effort should be to develop both *niche* and mass market segments. The *niche* markets to be developed consist of microwork related to English-to-Arabic (Segment A), and the mass market consists of the common and lower-paying microtasks of interests to youth and women (Segment C). Another focus is on centers outside Ramallah that have the highest populations. Hence the three priority centers would be Gaza City, Hebron, and Nablus. However Gaza City, due to its higher rates of unemployment and tighter restrictions on movement and access, could be the priority from a development perspective. In addition PT should focus on the demographic segments that correspond to the tasks; as identified in Table 8.

6.11 The strategic approach in the immediate- to short-term is to use well-designed, selective and limited piloting to confirm PT's comparative advantage in identified microtasks, to validate Palestinian youth and women's interest in the mass, but lower-paying, microtasks due to its significant development impact, and to use intermediaries to overcome PT's inherent challenges related to international micropayments.

6.12 Conceptual Implementation Plan

- *Immediate-term (nine months to one year, estimated at \$80,000 to \$120,000)*
 - Design the two pilot intermediaries, with a mix of:
 - Microtask types: primary focus on segments A and C consisting of various types of English-to-Arabic related, mass and lower-paying microtasks; secondary focus on segments B and D consisting of Arabic-related and e-lancing work.
 - Locations, with one in Gaza and the other in Hebron or Nablus.
 - Target different microworkers, in terms of a mix from various demographics, the channels to reach them, size of pilot group, etc.
 - Intermediary's business and operational models consisting of its form, structure, systems, processes, etc. This will be a mix of NGO, academic, or private sector

- operated; international and/or local platforms, local micropayment mechanisms (e.g., banks or post offices), etc.
- Facilitate networks and partnerships for pilot intermediaries:
 - Initiate contacts with international aggregators and potential local intermediaries.
 - Provide match-making workshops to facilitate direct dialogue, contact, and interaction between international aggregators and potential local intermediaries.
 - Provide technical advice for establishment and operations.
- Develop the M&E framework and plan.
 - Set up the logic model; including piloting goals, objective and scope.
 - Develop the M&E framework; including the elements to be monitored and evaluated, defining indicators and data sources, procedure for data and information collection, targets, and responsibilities, and reporting system.
- Others:
 - Identify and assess potential pilot microworkers via online/Facebook surveys and interviews
 - Establish the legal basis required for the contractual relationship between intermediaries and microworkers.
 - Ensure the design of the pilot’s encourages participation of women as microworkers.
 - Conduct a follow-up survey to measure awareness, interest, and potential partnerships for intermediaries.
- *Short-term (one to two years, estimated at \$200,000 to \$300,000)*
 - Conduct the two pilots:
 - Provide financial support for set up of pilot intermediaries (could leverage existing or planned programs; such as the matching grants under the World Bank’s PSD project).
 - Provide technical assistance to intermediaries.
 - Support familiarization training for pilot microworkers.
 - Encourage participation by women.
 - Conduct monitoring and evaluation..
 - Assuming piloting results confirms that microwork is feasible for PT; to develop a detailed strategy and implementation plan for the medium- to long-term, that is refined and expanded based on the pilots’ results.
- *Medium- to long-term (Years 2 and beyond):*
 - Strengthen value proposition and establish first or early-mover advantage to strengthen skills of existing microworkers in proven *niche* microtasks, and build relevant skills (English) of potential microworkers.
 - Build comparative advantage in selected types of mass, lower-paying microtasks.
 - Promote skill certifications of microworkers, leveraging on internationally recognized BPO certifications in the market.

- Conduct limited communication programs for international aggregators and direct microwork clients to increase their awareness and interest in providing microwork to PT.
- Expand and strengthen relationships with international aggregators and service providers.
- Support local intermediaries in their transition from local aggregation to international service providers that cater directly to clients in developed countries.
- Expand microwork industry:
 - Scale-up intermediaries of successful pilots.
 - Promote set-up of intermediaries across other population centers.
 - Mass communication campaigns to promote microwork to Palestinian youth, and, especially, women/
 - Support establishment of microwork-focused industry association.
- Leverage microwork for strategic and sustainable development:
 - Ensure access to computers and Internet by youth remains competitive from a global perspective.
 - Ensure changes to labor law are not burdensome for microwork; especially in terms of minimum wages, and employment benefits from part-time and informal employment.
 - Provide favorable tax regime and other incentive programs for microwork industry.
 - Develop global reputation for comparative advantage in *niche* microtasks.
 - Promote intermediary and service provider process certifications, based on internationally recognized certifications such as ISO and Six Sigma.

Roles of Stakeholders

6.13 The possible and appropriate roles of various stakeholders are described below and they cover roles over various time horizons.

6.14 *Palestinian National Authority*. Have appropriate roles in the medium- to long-term effort to catalyze and support industry growth, and to build capacity and ownership in this industry. Hence the PA may:

- Implement mass scale-up and replications of pilots across PT (e.g., through matching grants and other tax incentives),
- Carry out cross-sectoral activities that will help in building first-mover advantage (e.g., ensuring alignment of education system and TVET programs to provide the appropriate skills for microwork,)
- Ensure a policy or regulatory environment that supports the growth of microwork for PT's development (e.g., microwork-friendly labor and Internet regulations).

6.15 *Donors*. Have appropriate roles in the immediate- to short-term to further explore the industry from a financing and technical assistance perspective. Donors can bring the social, environmental, and fiduciary care needed to explore microwork in an inclusive and sustainable

manner, and bring the initial trust needed for relevant local and international stakeholders. Donors could then support the short-term actions to design, facilitate and conduct the pilots; and in collaboration with the PA, private sector, and other relevant stakeholders develop the detailed strategy and implementation plan. Donors can take a secondary role in the medium- to long-term as the local stakeholders should implement the larger activities needed, after the pilots have proven that the industry is viable.

6.16 *Private sector*: The role cuts across the various activities, both as secondary beneficiaries and participants in the microwork industry development process. The private sector is needed to:

- Partake in the pilots as one of the private sector model of intermediary
- Contribute inputs and collaborate on the development of the detailed strategy and implementation plan
- Partake in the mass scale-up and replications process as microwork intermediaries
- Collaborate with the government on various other aspects of development activities of the microwork industry in the medium- to long-term.

6.17 *Academia*. Have appropriate roles in the immediate- to short-term as a possible participants in design and piloting, but its more appropriate role is in the medium- to long-term activities related to ensuring available quantity and quality of microworkers, provision of a secure and trusted venue for new microworkers, and to develop and implement certifications systems and process for microworkers and intermediaries.

6.18 *NGOs*. Have appropriate roles in the immediate- and short-term as possible participants in pilots, and secondary participants in the medium- to long-term as champions and change agents for promotion microwork. NGOs would:

- Participate (possibly) in pilots as NGO-driven model of intermediary
- Provide networks to large sections of youth, and local promotion of microwork to Palestinian youth
- Provide collective, youth-oriented inputs and guidance during the process of industry development.

6.19 *Palestinian youth and women*. Have appropriate roles in all the activities; both as the primary beneficiaries and as participants for industry development. Youth and women would:

- Participate in a limited way as microworkers in the pilots
- Provide first-hand inputs for development of strategies and plans
- Participate in a large-scale participation (especially women) during eventual scale-up and replication
- Represent the “face” of microwork to peers who are potential microworkers
- Contribute first-hand inputs for other medium- to long-term activities.

Annex I: Classification and Tagging

Classification is the process of assigning an object (e.g., an image, a video or text or audio) one of a finite label. For example, whether a car is on a picture (a common task in content moderation for automobile markets), is a simple yes/no-classification task with "yes" or "no" as two possible labels. Using Figure 1 as an example, classification allows for a given picture only one of three allowed labels (e.g., a) it could be of concern to someone, b) not of any concern and c) the classifying entity (be it human or machine) is uncertain). This is a common task in content moderation, e.g., for sites that allow user-generated content, such as photo communities

Tagging is the process of assigning an object (e.g., an image, a video or text or audio) with one or more of a potentially infinite set of labels. For example, what happens on flickr, delicious, and other platforms is tagging as people can assign videos, images, etc. any set of labels (e.g., "yellow parade", "Amsterdam", "2008"). In this sense tagging is a superset of classification, which only allows the assignment of one label out of a finite set of given labels.

Annex II: Estimation of Global Market Size

This annex describes the approach for estimating the global microwork market size per year. It is to be noted that the numbers are based on a simplified hypothesis, limited data, and authors' estimates of various factors. The derivation is described below. Table A estimates the total number of microworkers in the world:

Table A: Estimates of Total Number of Microworkers

Company	Estimated Workforce (in 1,000s)	Percentage of Company's Business in Microwork (Estimated)	Adjusted Workforce (in 1,000s)	Source for Estimated Workforce
AMT	500	95	475.00	http://crowdresearch.org/blog/?p=2135
CloudCrowd	125	70	87.50	http://www.serv.io/company/about
Clickworker	200	95	190.00	http://www.clickworker.com/en/about-us/
Microtask	85	95	80.75	http://www.microtask.com/cases
Bitworxx	30	95	28.50	Authors' estimation
utest	60	95	57.00	http://www.utest.com/meet-testers
99designs	30	50	15.00	Authors' estimation
Crowdcontent	15	90	13.50	Authors' estimation
Textbroker	25	95	23.75	Authors' estimation
onehourtranslation	15	95	14.25	Company website and authors' estimation
Samasource	2	100	2.00	http://samasource.org/
Mobileworks	10	100	10.00	Authors' estimation
Total			997.25	---

Source: Authors' Analysis

The estimated workforce is from the microwork companies as they are available on their website, or estimated by the authors. It is noted that some of these numbers are overstated and are adjusted for below. The percentage of microwork business of each company is also estimated by the authors to deduct the companies' business in other forms of paid crowdsourcing (such as e-Lancing). The adjusted microwork-force therefore reflects the estimated number of workers performing microtasks in each company. Based on these estimations the total number of microworkers worldwide is 997,250.

Table B below develops these simplified estimates further. There is an expected overlap of workforce across the companies of an estimated 50 percent. However this is offset by the fact that the estimates could reasonably be multiplied by a factor of 2, as they cover only limited and known platforms. The payout per worker is estimated conservatively at \$208 per year, which is based on 4 hours' work per week, at \$1 per hour for 52 weeks. Hence the estimated payout to microworkers is \$207 million per year. As microwork companies typically make a margin of at least 150 percent on payout (or 33 percent on gross revenue), the total industry revenue is estimated at \$311 million per year.

Table B: Calculations for Total Industry Revenue

Description	Quantities
Total Estimated Number of Microworker from Known Task Platforms	997.25
Estimated average payment per month (at 4 hours/week, \$1/hour, and 52 weeks/year)	208.00
Estimated Total Payout to Microworkers Per Year	207,428
Estimated Revenue by Microwork Aggregators (Estimated at least at 150 percent of Payouts; or 33 percent Margin)	311,142

Source: Authors' Analysis

Annex III: Tables for Economic Analysis

Table A. Based on 20 percent Employment of ICT Sector (in PTEs Equivalent)

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Totals
<i>Calculation for Equivalent Number of PTEs in the ICT Sector based on 4 Hours Per Week of Microwork</i>						
Number of FTEs in ICT Sector (In Year 2008, Zero Growth Assumption)	5,200	5,200	5,200	5,200	5,200	--
Working Hours Per Week	40	40	40	40	40	--
Estimated Working Hours Per Week for Microwork PTEs	4	4	4	4	4	--
Equivalent Number of PTEs in ICT Sector	52,000	52,000	52,000	52,000	52,000	--
<i>Calculation for Potential Number of Microwork PTEs</i>						
Estimated Number of Microwork PTEs as a Percentage of ICT Sector PTEs	20	20	20	20	20	--
Estimated Employee Growth Rates (Normal Curve, Cumulative) (%)	5	15	30	60	100	--
Number of PTEs (Adjusted, Cumulative)	520	1,560	3,120	6,240	10,400	21,840
Equivalent Number in FTEs (Cumulative)	52	156	312	624	1,040	--
<i>Calculation for Total Earnings/Revenue and Value Add of Microwork PTEs</i>						
Microtask Price Per Hour (Assuming Zero Growth)	2	2	2	2	2	--
Total Hours Per Year by Each Microwork PTE (At 52 Weeks Per Year)	208	208	208	208	208	--
Total Earnings/Revenue Per Year by Microwork PTEs	216,320	700,877	1,513,894	2,595,840	4,326,400	9,353,331
Average Value Add for Service Sector in PT (%)	70.06	70.06	70.06	70.06	70.06	--
Total Value Add by PTEs Per Year (Actual USD)	151,554	491,034	1,060,634	1,818,646	3,031,076	6,552,943
<i>Calculation for Net Present Value (NPV)</i>						
Cumulative Discount Rate (Based on Average of Local Banks' Lending Rate Over 5 Years) (%)	7.41	14.82	22.23	29.64	37.05	--
Discounted Cash Flows and NPV for Industry Value Add	140,324	418,263	824,855	1,279,599	1,908,062	4,571,103

Table B. Based on 50 percent Employment of ICT Sector (in PTEs Equivalent)

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Totals
Calculation for Equivalent Number of PTEs in the ICT Sector based on 4 Hours Per Week of Microwork						
Number of FTEs in ICT Sector (In Year 2008, Zero Growth Assumption)	5,200	5,200	5,200	5,200	5,200	--
Working Hours Per Week	40	40	40	40	40	--
Estimated Working Hours Per Week for Microwork PTEs	4	4	4	4	4	--
Equivalent Number of PTEs in ICT Sector	52,000	52,000	52,000	52,000	52,000	--
Calculation for Potential Number of Microwork PTEs						
Estimated Number of Microwork PTEs as a Percentage of ICT Sector PTEs	50	50	50	50	50	--
Estimated Employee Growth Rates (Normal Curve, Cumulative) (%)	5.0	15	30	60	100	--
Number of PTEs (Adjusted, Cumulative)	1,300	3,900	7,800	15,600	26,000	54,600
Equivalent Number in FTEs (Cumulative)	130	390	780	1,560	2,600	--
Calculation for Total Earnings/Revenue and Value Add of Microwork PTEs						
Microtask Price Per Hour (Assuming Zero Growth)	2	2	2	2	2	--
Total Hours Per Year by Each Microwork PTE (At 52 Weeks Per Year)	208	208	208	208	208	--
Total Earnings/Revenue Per Year by Microwork PTEs	540,800	1,752,192	3,784,735	6,489,600	10,816,000	23,383,327
Average Value Add for Service Sector in PT (%)	70.06	70.06	70.06	70.06	70.06	--
Total Value Add by PTEs Per Year (Actual USD)	378,884	1,227,586	2,651,585	4,546,614	7,577,690	16,382,359
Calculation for Net Present Value (NPV)						
Cumulative Discount Rate (Based on Average of Local Banks' Lending Rate Over 5 Years) (%)	7.41	14.82	22.23	29.64	37.05	--
Discounted Cash Flows and NPV for Industry Value Add	350,809	1,045,658	2,062,138	3,198,997	4,770,156	11,427,757

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