POSITION PAPER

Digitization And Work: Potentials and Challenges in Low-Wage Labor Markets

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This report examines the question of the future of work and technology through two issues. One is how digitization can enhance the work life of low-income workers by addressing the specific needs of these workers at their workspace and in their neighborhoods. Low-wage workers can gain from the development of digitized apps and tools that address their needs. The high-end worker is already a full and effective user of these technologies, and in the US, most digital applications have been geared to the middle classes and high-end workers and households. Very little has been developed to meet the needs for low-income workers, their families, and their neighborhoods. This is a bad and sad state of affairs given the needs of these workers and families. The data indicate that most of these workers and their families have access to digital apps, and are willing to spend some money on acquiring apps. We also know that access to digital apps is overwhelmingly through their phones–especially Android phones, rather than through email or iPhones–which is another constraint that leaves many low-income potential users of digital apps at a disadvantage. We need more innovations that meet the needs and constraints of low-wage workers.[1]

Against this set of conditions, I focus on how digital innovations can address the needs of low-wage workers, their families and their neighborhoods. I will discuss recently developed applications geared towards low-income people and neighborhoods. But I will also examine existing or planned applications aimed, whether knowingly or de facto, at professionals, corporations, or scientists that could be adapted for use by low-income workers, families, and neighborhoods.

[1] The major reasons why this matters are examined in the author's 2014 book *Expulsions: Brutality and Complexity in the Global Economy* Cambridge, Mass: Harvard University Press/Belknap Book). An explanation of the asymmetries contained within the development of digital tools emphasized in this essay can be found in the author's 2012) "Interactions of the Technical and the Social: Digital Formations of the Powerful and the Powerless." *Information, Communication & Society*. http://www.tandfonline.com/doi/abs/10.1080/1369118X.2012.667912#.VRrndWbx8zA

A second major issue I address in this report concerns an emergent complication that increasingly affects all workers. It derives from the use of semi-automated systems, which have seen particularly sharp innovations in the world of work. Such systems can generate ambiguity about responsibility when something goes wrong insofar as the worker still has a role in their deployment. In the case of factory and delivery workers, the increase in the use of robotic tools and machines can be devastating if something goes wrong since they probably don't have access to specialized lawyering if the employer does not pay for it and is in most cases the accused party anyhow. High-end workers also confront this given the sharp increase in the use of automated computer transactions of important/high-value operations that generate a similar ambiguity regarding responsibility for a mistake. But they are likely to have access to that specialized lawyering. One helpful source for in-depth discussion of this ambiguity about responsibility (the machine or tool versus the worker using it) can be found in a series of lawsuits: these provide detailed information about how workers can easily be at the losing end of such lawsuits. But they also make visible the ambiguities of the work process and the available laws in establishing who is guilty when something goes wrong. I will briefly discuss some of these lawsuits and related issues.

Transforming The Neighborhood Into A Social Back-Up System

My argument and proposal regarding the low-wage labor market is that what would most enable low-wage workers is the extension of digitization to the larger space within which these workers operate: not only the workplace narrowly understood, but also, and very importantly, their neighborhood. While this may sound a bit extreme, it is already a fact among high-end workers: digitization has become a way of restructuring not only the workspace but also the living space of these workers. It is inconceivable today that the high-end worker can or does simply leave it all behind when closing the door of her office for the day—on those few days every week when s/he might actually work in the office. We might say the correlation for the low-wage worker is that it is a fiction that s/he can simply leave it all behind when s/he closes the door of her home and goes to work.

Digitization can help transform the neighborhood into a social back-up system. The home and the neighborhood have long been support spaces for the working class. Today, the workspace and the neighborhood are underperforming when it comes to support, mostly due to changes in the condition of low-wage workers. Digitization can help rebuild some strength in these spaces. For instance, in case of trouble (a sick child of a parent who is at work, police violence, etc.) a digital application on all neighborhood residents' phones can be a call for quick deployment of neighbors, grandmothers, hair dressers, shop-keepers, and other somewhat stationary people. This can also become a first step in a trajectory towards greater neighborhood integration and expanded use of diverse digital capabilities.

Two key assumptions organize my analysis.

One is that the lack of digital apps that meet the needs of low-income workers and neighborhoods is an added disadvantage for low-wage workers, their families and their neighborhoods. For instance, it reduces their capacity to connect promptly the three of domains of their lives (work, family, neighborhood) when needed. Low-wage workers have their phones, but a telephone call is far more visible at the workplace (and likely to be seen as invasive by the boss) than clicking on an app on their phones: it will do the work of communicating if the neighborhood is part of a network. In contrast we know that high-end workers (especially if they have small children) have video-links to stay connected to their homes and nannies.

The second is that the sense of self worth of workers can be enhanced by recognition from a larger social context, notably the neighborhood, and that this in turn has positive effects regarding collective initiatives at the workplace and in the neighborhood. One feature that matters is the possibility of mobilizing the neighborhoods as an active space that functions beyond the workplace : a space of support in case of a health crisis with a child, for organizing a union strike, for making (as in urban agriculture, craft work, etc.). The activated neighborhood can enhance workers' sense of the worth of what they contribute to the neighborhood and to the larger society. High-end workers have long been praised for their contributions to society. But low-wage workers lack such recognition, so their community should generate it.

The Underutilization Of Digital Tools And Apps In Low-Income Neighborhoods

I begin by focusing on the underutilization of digitization in the larger life-space of low-wage workers: a subject that we must address but has thus far received little attention. In contrast digitization at the workplace has been the subject of much research and attention for well over a decade.[2]

I see this as a sharp contrast with the intense use of digitization in the work and life space of high-end workers. To remind us of familiar numbers let me quote this 2014 article.[3] These numbers have probably further increased for high-end workers, but less so if at all for low-income workers.

> *"In total, 30 million Americans work from home at least once each week, which will increase by 63% in the next five years. About 3 million Americans never go to an office and 54% are happier working from home than in an office. Furthermore, 70% of employees work from alternative locations (not just home) on a regular basis."*

The key aspect that concerns me here is that this digital under-utilization constructs a radical differentiation between work space and life-space (i.e. the neighborhood) for low-wage workers. This is disabling and adds to the difficulties in their daily life at work and off work.[4] Neighborhood is here used as a somewhat generic term to capture a fairly large local area with reasonable transport and generally modest socio-economic standing of households.

The question then is what can we do with current technologies but are not doing because of diverse reasons: lack of resources, lack of motivation, lack of interest in low-income households, individuals and localities, and so on. Important to this report, and too often overlooked, is that the types of digital applications that are being developed mostly do not address the needs/limited resources of low-income workers, their households, and their neighborhoods.

This is an especially unacceptable situation because data from diverse sources shows that low-income individuals in the US are users of digitized devices, most especially through mobile

[2] This is not a new subject when it comes to the domain of work, see e.g. Freeman 2002; Autor, et al. 1998; Ellison 2004; Fountain 2005; for early studies on the social side see e.g., Haythornthwaite and Weldman 2002; Ellison 2004.

[3] One In Five Americans Work From Home, Numbers Seen Rising Over 60%

[4] Thus Richard Freeman finds that when the internet took off it helped workers seeking to mobilize support: (p.25) "This union is able to survive even though the probability of getting a collective agreement from IBM in the US is minimal because the Web offers it a low cost way to connect with IBM workers and the general public."

telephones, and then particularly Android models. In one of their recent overviews, the Pew Center found that 45% of households living with less than $30K per year and 39% of those living on $30K -$50K use mobile phones as their primary way to access the internet. Email at home is rare. In a larger investigation on digital technology use by women across the world that I prepared for the United Nations Development Program, I found extensive use of mobile telephones by modest-income and poor women in poor areas of Africa: the mobile phone is what allowed these women to run their businesses, which were mostly diverse types of small-scale trading.

It is becoming increasingly clear that low-income households and low-income workers need mobile-friendly products. The use of web solutions is at this time limited, in contrast to what is the case for high-end workers both at the workplace and at home. The available evidence shows that music and other entertainment apps are the most used by low-income individuals or members of low-income households: these are standardized mass markets to which all consumers are welcome, including low-income buyers. But most available apps and most of the new apps coming online are geared to the middle classes, not to low-income individuals, households or neighborhoods. For instance, there are long lists of apps for contacting or finding spas, high-end restaurants, and a long list of other such pricey luxuries. But there are few if any apps that give you information about a healthy food shop in a modest-to-poor income area in a city. In short, what is absent is applications that address the needs of low-income individuals and households.

Useful Apps For Low-Income Workers And Neighborhoods

Several efforts are beginning to address some of these needs. Here are a few examples of mostly recent applications geared to modest-to-low-income households and neighborhoods. *Kinvolved* is an application for teachers and after school program leaders that makes it easy for them to connect to parents in case of a student's lateness or absenteeism. In many of our schools in poor neighborhoods lack or difficulty of communication between the school and a student's home has allowed self-destructive conduct to worsen, damaging a student's chances for a job or acceptance to college. This app is simple and straightforward: when a teacher, or a coach, or whoever is part of the student's adult network at school, takes attendance or sees something of concern, the family is immediately notified via text messages or email updates—whichever they prefer. The low-income worker knows that if there is trouble s/he will be alerted.

Another app, developed by Propel, simplifies applying for government services, a notoriously time-consuming process. Now there is the option of a simple mobile enrollment application. Yet another such application is Neat Streak, which lets home cleaners communicate with clients in a quick non-obtrusive way. There is also a money management app for mobiles which combines cash and loans requests, again simplifying the lives of very low-income people who need to cash their pay checks before pay-day, and can avoid the high interest rates charged by so called “pay-day sharks.” But as yet there are few such applications of use to modest-income workers and households, compared with what is available in the high-end consumer sector.

A very different type of app from the aforementioned, far more complex and encompassing is Panoply (presented by Robert Morris): an online intervention that replaces typical therapy involving a health professional with a crowd-sourced response to individuals with anxiety and depression. What I find significant here is that it has the added effect of mobilizing a network of people, which may be one step in a larger trajectory of support that can also become a local neighborhood network. Panoply coordinates support from crowd workers and unpaid volunteers, all of whom are trained on demand, as needed. Panoply incorporates recent advances in crowdsourcing and human computation enabling timely feedback and quality vetting. “The therapeutic approach behind this system is inspired by research from the fields of emotion

regulation, cognitive neuroscience, and clinical psychology, and hinges primarily on the concept of cognitive reappraisal." Crowds are recruited to help users think more flexibly and objectively about stressful events.

Another useful tool seeks to develop new ways of working together online (Aragon et al.). This is something quite common among middle class users and in certain professional jobs, but far less likely among low-income workers. And while it is not necessarily aimed at low-income workers and families, it could be extremely useful to the latter. It can enable a sense of individual worth to a network, and thereby solidarity and mobilization around issues of concern to low-income neighborhoods, families, and workers. Again, it can feed into individual worth ("I matter to my community") and a sense of collective strength. I would also highlight here tools for sex workers, enabling them to move online and gain strength through sharing information, and possibly organizing (see, e.g., Melissa Gira Grant, The Red Light and the Cloud).

Then there are, of course, the fancier apps aimed at scientists or corporations, but these should also become part of the tools (and experiences!) of low-income workers and neighborhoods. Here is one that might well be great also for immigrants who have dear ones far away but need/want to be part of their education broadly understood. For instance, take a Filipino mother who is working as a nurse or a domestic worker here in the US, and has her children at home, a very common fact. An MIT Media Lab project (The Communication Of The Future Is So Real You Can Touch It) aims at going well beyond the currently remote communication options by mobilizing one's sensorial response. Currently, remote communication (including that done in working environments) is an elementary, and in that sense, incomplete experience. The app aims at experiencing "...a faraway friend's footsteps walking alongside me as we share an afternoon stroll. Different streams of interface broaden our meaning of a physical world," (Hiroshi Roshi) (see also the installation Mirror Fugue).

An important long-distance option—though not as far away as the above example—is of course, telemedicine, which for low-wage workers with constraints to their mobility given little home support, can be a major help. Or it can be used to argue the mobility constraints of low-wage workers, who may lack full time nannies, and may have elderly living at home, all of which reduces their options of leaving home (Taly Sharon and Ariel Frank, Utilizing Multimedia Technologies for Interactive Telesonography).

Apps That Can Strengthen The Collective Space

A second vector that I think should become part of the experience of low-wage workers is a sense of their worth in a general societal sense. High-end workers often are praised for adding value to our economies, for their intelligence and capacity to do complex work, and so on—recognitions, by the way, that are not necessarily always warranted. Low-wage workers should also be recognized as mattering for the larger social good. This has long been one of my research questions. Every epoch and every sector contains its own answers to this question.

There are diverse ways in which the worth of these workers as individuals can become a sort of collective good—meaningful to the workers themselves and to a larger community. One aspect that has long interested me is how even the poorest communities or groups of workers add to the public good and can experience themselves as adding to the public good.

The Netherlands provides a good example of such recognition of worth. Its health system is based on the principle of universal care. It includes a neighborhood system as a key part of the medical apparatus. When a patient can go back home but still needs care, the immediate neighborhood is

promptly alerted and designated residents (who have time, and are not ill) organize themselves to ensure 24-hour oversight: the patient will at all times be able to use a simple app to call on the neighborhood care-givers, and the latter will also make regular visits. All these care givers, but also the whole neighborhood, are recognized as being a sort of public actor contributing to the public good.

Positive neighborhood effects are a long-standing aspiration. Much of that was eventually lost. But it also always recurs. Thus fifteen years ago, Bailyn et al. (2001 pp. 47-48), once again emphasized its importance. Let me quote at length:

> *"Communities have not been a large part of the thinking about work-family issues. Employees are viewed as being either "at work" or "at home," as if there were no larger context of social relationships and institutions outside of the family to which households and individuals belong. But it is the very "embeddedness"—or lack of embeddedness—of families and individual family members in specific communities that may determine whether employees can successfully negotiate the worlds of work and family. Similarly, it may be the embeddedness, or lack of it, of businesses in the communities in which they are located that determines their success in recruiting and retaining workers, and in selling their services or products. Employers and members of their workforces must acknowledge and contribute to the communities of which they are a part. The quality of community life is important to the survival of both employers and employees, and communities need the involvement of both to build and strengthen their capacity to offer livable environments for all."*

This signals that the neighborhood can expand the knowledge space of one's work life. Key components of the neighborhood work space we can think of are, among others, the use of digital technologies to work at home, to make what we now buy, to design for one's use or for sale. And it would make out of the neighborhood an interconnected space enabled by apps that are designed with low-income neighborhoods in mind. The key image is that even modest neighborhoods and modest-earning workers are immersed in spaces that collectivize specific needs of neighborhood residents.

New Challenges That Call For Neighborhood Collective Action

There are a range of trends that we can discern which signal a growing importance of the neighborhood for work along with a high risk of bi-modal income distributions—high incomes for some workers and low-incomes for others. Online work is an example. While a good share of online work is high-level professional, much online work is at risk of becoming a zone for exploiting workers. It is in my view a key focus to ensure low-wage workers have a productive workplace and living space.

Much of the writing about this is uncritical, which I find problematic. It emphasizes the advantages for employers and overlooks workers' low wages and lack of protections. For example, in an overview of the growth of work online, Houlne and Maxwell (2013: ch 2) write:

> *"Professionals who want to thrive in this new environment have to think differently. The online virtual-work market reached more than $1 billion in 2012 alone, and it's predicted that a massive one-third of the global workforce could be hired online by 2020. Some reports argue that it could be as high as 50% of the global workforce."*

In a blog article Elena Kvochko (2014) refers to data showing that:

> *"…employers are bullish on online freelancers. Nearly 85 percent of businesses that use online jobs marketplaces say that hiring online gives them advantages over their competition, and almost three-quarters report they intend to hire more online. By tapping into online freelance pools, employers transcend geographical boundaries and bypass many employment restrictions."*

The challenge is going to be to avoid a race to the bottom. The neighborhoods, or equivalent spaces, need to become spaces where the fact that workers can work from home becomes a positive both for the workers and for the neighborhoods. It will take a certain type of collective action, with mutual support rather than falling into the horrors of competing for increasingly low paid online work and therewith sowing mistrust in the neighborhood. The neighborhood should function as a tool for collectivizing—in the same way that a large firm can become a ground for collectivizing workers demands. For online workers, the neighborhood becomes the equivalent space. But this can only happen if the neighborhood is a space for connecting, collaborating, and mutually recognizing each other—in short a space where networking and collectivizing can strengthen the neighborhood and hence the bargaining power of online workers. In their blog article about the globalizing internet-based world of work, Waters and Kuchler (2014) get at this possibility of workers collectivizing their struggle:

> *"The spread of mobile devices is forcing deeper changes, particularly in the way groups of workers communicate and share information. The result has been a deeper challenge to Microsoft's grip on the software of working life."*

Who Is Responsible When A Digitized Process Goes Wrong

The concern here is that low-income workers are likely to experience additional vulnerabilities if there is a breakdown in a (partly) automated production process. Here I present a few cases that illustrate a range of possible complications.

A first case (Edeh v. Equifax, U.S Court of Appeals, 8th Circuit) concerns the use of an automated process to determine that a credit card balance had not been paid. The evidence outside the automated system showed that the system had failed and was in error. But the sitting party (i.e. the boss or supervisor) refused to deviate from the decisions produced by the automated system process even when confronted with evidence outside of the automated process.

> *"In this action, Edeh contends that Equifax repeatedly failed to conduct a reasonable reinvestigation into his consumer credit file that included an unpaid balance on his Capital One credit card account ("the Account"). Despite Edeh's detailed, specific disputes which were corroborated by supporting documentations, including paid-in-full letters from Capital One, cancelled check, and Wells Fargo bank account statement, Equifax would not perform a reasonable investigation and instead relied exclusively on its automated dispute process."*

The decision in this case supported the plaintiff against the automated system.[5] But it indicates in a brutally simple way how far willfulness can be justified by invoking a technological capacity that can easily be seen as superior to a "lowly" worker. The implications are worrisome, and we need

[5] Samuel EDEH, Plaintiff-Appellant, v. EQUIFAX INFORMATION SERVICES LLC, Defendant-Appellee., 2013 WL 6158623 (C.A.8) Citing Safeco Ins. Co. of Am. v. Burr, 551 U.S. 47, 127 S. Ct. 2201, 167 L. Ed. 2d 1045 (2007)

digital apps that can engage this type of case at the workplace, where the evidence is often not based on documentation by a third institution as in this case.

Here is another case where an automated system is given status over a person. Bank of America made a series of automated calls (determined through an automated schedule-making process) to a couple that had late payments on their mortgage. This case shows an interesting option: taking the Bank to court for its harassment through robocalls. The couple was able to collect money for damages after winning a harassment suit.[6] Again, low-income workers might not be able to take Bank of America, and such, to court.

There is clearly a broad range of issues raised by this type of reliance on the digitizing of bureaucratic tasks and accountability. Perry and Smith provide a useful overview on the legal implications of automated decision-making.[7] Here is a quote that captures some of this:

> *"Is the concept of delegation appropriately used in this context at all? After all, unlike human delegates, a computer programme can never truly be said to act independently of its programmer or the relevant government agency? What if a computer process determines some, but not all, of the elements of the administrative decision? Should the determination of those elements be treated as the subject of separate decisions from those elements determined by the human decision-maker?"*

In her book on Accountability in a Computerized Society, Helen Nissenbaum, gives us a more technical analysis into the same question. She addresses the issue of "many hands" which is discussed in much of the literature about accountability as it relates to new technology. She concludes that it is difficult to pinpoint one particular agent for responsibility when so many are involved. Is the software engineer culpable? Is it the low-level employee who inputs data into the digitized decision-making processor?

> *"This obscuring of accountability can come about in different ways. In some cases, it may be the result of intentional planning, a conscious means applied by the leaders of an organization to avoid responsibility for negative outcomes, or it may be an unintended consequence of a hierarchical management in which individuals with the greatest decision-making powers are only distantly related to the causal outcome of their decisions. Whatever the reason, the upshot is that victims and those who represent them, are left without knowing at whom to point a finger. It may not be clear even to the members of the collective itself who is accountable. The problem of many hands is not unique to computing but plagues other technologies, big business, government, and the military."*

Focusing on the interface design, Mary L. Cummings, argues that, indeed, digitized systems do create a kind of moral buffer between the system operator and the results of the decision, so these types of interfaces (especially where there is a greater chance for harm) should be assumed and accounted for in the design of the decision-making software.

Because of the diminishment of accountability that can result from interactions with computers

[6] Couple Wins $1M Suit Against Major Bank for 'Outrageous' Robocall Harassment (ABC News).

[7] For information and cases see Automated decision-making: Big Brother is watching and now deciding.

and automation, I find that some sort of compartmentalization should be inserted when developing a human computer interface for any system that has the ability to harm people (such as interfaces for weapons and medical interfaces). The aim is a "moral buffer," a form of distancing and compartmentalization which allows people to morally and ethically distance themselves from their actions. The concept of moral buffering is related to but not the same as Bandura's (2002) idea of moral disengagement where people disengage from moral self-censure in order to engage in reprehensible conduct. A moral buffer adds an additional layer of ambiguity and possible diminishment of accountability and responsibility through an artifact or process, such as a computer interface or automated recommendations. Moral buffers can be the conduits for moral disengagement, which is precisely the reason for the need to examine ethical issues in interface design.

I conclude with a quote from Eric Marsden's Control and Accountability in Highly Automated Systems, where he describes why accountability should possibly be diminished when digitized decision-making processes are used:

> *"Automation of decision-making functions may reduce the operator's awareness of the system state and of changes to the environment. Humans tend to be less aware of changes in environmental or system states when those changes are under the control of another agent—whether that agent is automation or another human [...]."*

Clearly, we are entering an era where many of these ambiguities will have to be addressed. The risk is that the interests of corporations and other powerful actors shape the laws and the criteria for accountability. Low-wage workers will have to find the spaces of collective action from which they can hope to fight to protect their basic rights. There are others—the legislature, online spaces. The space of the neighborhood is one of those spaces—it may provide the ground level for neighborhoods to organize collectively online.

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