Framing the (in)visible: Insights into Visibility Practices of Remote Knowledge Workers

Mahan Mehrvarz
AI Futures Lab
Delft University of Technology
Delft, Netherlands
m.mehrvarz@tudelft.nl

Dave Murray-Rust
AI Futures Lab
Delft University of Technology
Delft, Netherlands
d.s.murray-rust@tudelft.nl

Himanshu Verma
Knowledge and Intelligence Design
Delft University of Technology
Delft, Netherlands
h.verma@tudelft.nl

Ben Wagner
AI Futures Lab
Delft University of Technology
Delft, Netherlands
ITU Austria
Linz, Austria
Inholland
Amsterdam, Netherlands
B.Wagner@tudelft.nl

Abstract

Remote collaboration technologies shape how workers are perceived by colleagues and managers, influencing career progression, trust, and workplace dynamics. This study examines visibility practices—also known as self-presentation or impression management—by exploring interactions through which remote workers establish and maintain visibility. Through 16 semi-structured interviews with remote knowledge workers across various roles and regions, we identify key visibility practices: participating in meetings, leaving traceable links to quality work outputs, and reappropriating miscellaneous features to become visible for others. However, these practices are deeply intertwined with negative psycho-social externalities such as internal pressures, fears, mistrust, and privacy concerns that endanger workers' overall well-being. Our contributions include (1) empirical insights into workplace visibility and its entangled psycho-social complexities, (2) *visibility ecosystem* as a socio-material frame, capturing human-technology interactions in when visibility is at stake, and (3) design implications for collaboration technologies that support visibility practices while mitigating associated psycho-social externalities.

CCS Concepts

• **Human-centered computing → Computer supported cooperative work**; *HCI theory, concepts and models*; *Empirical studies in collaborative and social computing*.

CHIWORK '25, Amsterdam, Netherlands

ACM ISBN 979-8-4007-1384-2/25/06
https://doi.org/10.1145/3729176.3729178

Keywords

Visibility, Impression Management, Collaboration Technologies, Remote Work, Future of Work

ACM Reference Format:
Mahan Mehrvarz, Dave Murray-Rust, Himanshu Verma, and Ben Wagner. 2025. Framing the (in)visible: Insights into Visibility Practices of Remote Knowledge Workers. In *CHIWORK '25: Proceedings of the 4th Annual Symposium on Human-Computer Interaction for Work (CHIWORK '25), June 23–25, 2025, Amsterdam, Netherlands.* ACM, New York, NY, USA, 14 pages. https://doi.org/10.1145/3729176.3729178

1 Introduction

The COVID-19 pandemic significantly accelerated the shift to remote work, marking the biggest change in workforce dynamics since post-World War II [53]. Between 2019 and 2021, remote work adoption in Europe rose from 5.5% to 13.5% [4], and in the U.S., from 5.7% to 17.9%, with 98% of workers, across a variety of professions, desiring remote work at least part-time even after the global pandemic ended[11].

Early research highlighted remote work's benefits, such as reduced commuting and increased efficiency [52]. However recent narratives point to the multi-faceted nature of remote work both for individuals and organizations [5]. While it enables flexible scheduling [42, 60], reduced stress, and higher job satisfaction [20], it can also blur work-life boundaries and increase isolation [7]. Moreover, organizations benefit from reduced real estate costs [42], while facing managerial challenges in monitoring performance [30]. Remote work, with its strong reliance on technologies, engages with multiple socio-technical dimensions such as work-life balance, job satisfaction, productivity, and visibility management [7, 30].

Collaboration technologies[1] like emails, video conferencing, project management apps, and virtual whiteboards, although used

[1]Collaboration technologies, close to what historically has been referred to as "groupware,"[32] are digital tools designed to facilitate communication, coordination, and the sharing of information and resources among individuals or teams.

in variety of work settings, are inseparable from remote work. While, in a co-located workspace, visibility can be practiced by simple presence and through in-person interactions utilizing variety of non-verbal cues[7] such as positive body language, eye contacts, or serendipitous encounters [69], in remote workplaces collaboration technologies are the sole window through which workers can project their professional selves and enable others to form impressions about them to eventually become visible in the desired way. This makes remote work a fertile ground to explore technology-mediated visibility practices.

Remote knowledge workers whose roles intensely involve acquiring and applying knowledge through Information and Communication Technologies (ICT) [66] are ideal employees to benefit from remote working arrangement as their responsibilities are not tied to any geographical constraints and can be performed using collaboration technologies from anywhere. However, this shift to remote working affect the way they are seen by their peers and managers leading to new challenges regarding their visibility in remote work settings [3, 15, 44, 64].

In other remote work contexts, such as the gig economy, technological features like "rated reviews"—on platforms like Fiverr and TaskRabbit—can enhance gig workers' visibility and potentially increase their hourly rates [22]. However, in remote knowledge work situated in organization dynamics, the equivalent of such technological affordances are less explored.

To this end, our paper investigates visibility and impression management practices among remote knowledge workers whose information-intensive work and organizational dynamics offer a rich context for this exploration. Our work addresses the following research questions about the socio-technical implications of visibility practices within the context of remote knowledge work.

> RQ1: What are the visibility practices of remote knowledge workers?
> RQ2: What motivations, purposes, and psycho-social effects are associated with remote knowledge workers' visibility practices?

To address these questions, We conducted 16 semi-structured interviews and performed a reflexive thematic analysis. Our contributions include (1) empirical insights into various visibility practices of remote knowledge workers as well as their psycho-social entanglements; (1) the introduction of the *visibility ecosystem*, a conceptual lens to captures the interplay between human actors, work artifacts, visibility practices, and collaboration technologies; and (3) design implications for the collaboration technologies, emphasizing collective visibility practices, the agency of work artifact in shaping visibility, shifting from presence and availability metrics to center contribution and effectiveness, and finally a call toward more conscious approaches towards reappropriation of any design intervention in collaboration technologies for gaining visibility.

2 Background

2.1 Workplace Visibility

Erving Goffman's *The Presentation of Self in Everyday Life* [28] has the most theoretical relevance to workplace visibility. He conceptualizes people as performers on various metaphorical "stages"—as social situations—to present their character. While Goffman's theory is about everyday physical life, it is not hard to extend it to the context of every day remote work [15].

Perhaps visibility and impression management are the most frequent ways to frame self-presentation in the context of everyday work. Impression management is often framed as activities to shape and control others' perceptions [2, 7, 65], often in favorable ways [6]. Similarly, visibility—with a more literal meaning—pertains to activities that regulate the extent to which workers' presence and identities are apparent to co-workers and supervisors [15, 33, 35, 49, 67].

Both visibility and impression—as academic jargons—receive theoretical clarity from almost identical literature where "Visibility", in [10, 15, 33, 67, 70], and "impression management", in [2, 43, 62, 65, 72], were framed in relation to Goffman's work. Despite slight differences, they are often interrelated, hard to meaningfully disentangle, and used interchangeably. For instance, Sun et al. [65] reports similar privacy tensions in "impression management" on enterprise social media to Hafermalz's insights on workplace privacy and "visibility" [33]. In understanding of this phenomenon we relate to the literature in media study and sociology [10], where visibility practices come with certain selectivity, directionality, and interpretation that determines when, to what extend, and for whom certain activities, workers, objects, and processes are knowable [18], maintaining the strong tie to the affordances of collaboration technologies. While we acknowledge that the two term "impression management" and "visibility" may be interpreted differently depending on the context, we decide to refer to such practices within the context of remote working as visibility practices.

Workers manage their visibility by engaging with three main areas: their managers, themselves, and their work. When interacting with managers, they aim to please and gain favor. When focusing on themselves, they strive to maintain friendliness and positivity. Finally, when it comes to their work, they invest in productivity, continuous learning, and self-promotion [73]

Hafermalz sees links between workplace visibility and the Neoliberal paradigm, where individuals are personal brands, motivated by competition to master self-presentation [33]. The individualistic free-market logic motivates workers to master self presentation to gain as much as visibility and exposure that the competition drives them to [71].

There has been extensive studies about visibility within HCI research, particularly on web and social platforms. This includes web users' impression formation [63], "selective visibility" in the LGBTQ+ community [14], Gen Z's use of emojis and memes to establish visible identity in China [72], and "Saving face"—as a privacy protection practices—in high-context societies [62].

In the context of remote work—with strong reliance on technologies—visibility have been also extensively explored within HCI research. Marlow et al. [43] developed a model for how GitHub platform workers form impressions based on public profiles that influence their decision making on push request. Research by Foong et al. [22] and Foong [21] examined complexities in online freelancing, including visibility and gender roles determine hourly wages. Koehne et al. [35] found that remote workers often "overcommunicate" aspects of their work to gain visibility. Also, professional platforms

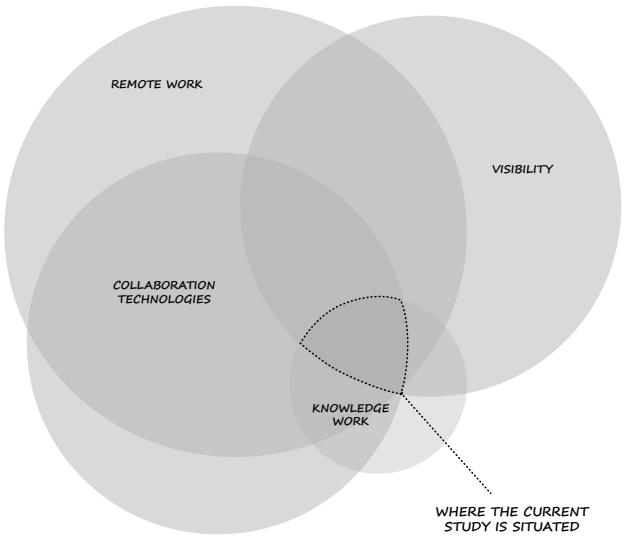

Figure 1: This study is situated at the intersection of HCI research on remote work and visibility management, focusing on how collaboration technologies enable visibility for remote knowledge workers.

like LinkedIn, Yammer, and other enterprise social media, performing within organizational boundaries, facilitate online visibility for remote workers [15, 65]. Similarly, Lee and Yuan [38] demonstrate how instant messaging (IM) fosters self-censorship as strategic impression management, shaping how workers present themselves to managers. However, there's a gap in understanding how everyday collaboration technologies, like video conferencing and messaging platforms, mediate, reshape, and infeluence visibility among knowledge remote workers within fixed organizational and team dynamics.

2.2 Remote knowledge work

Although remote work covers many activities [17, 24, 25], it generally refers to performing organizational tasks outside the main office, predominantly via ICT [25, 50, 52, 60, 68].

Remote work presents varied psycho-social effects on employees. According to Boell et al. [5], research shows mixed effects on job satisfaction, productivity, and work-life balance. Beside challenges including limited face-to-face interaction, performance monitoring difficulties, lack of mutual context, and increased distraction, it also raises concerns about and workplace visibility and impression management [7, 30].

Transitioning from co-located office to remote work settings replaces spontaneous interaction and non-verbal cues, with the limited audio-visual capacity of computer-mediated interactions [3, 15]. Remote performance is less "seen" which motivates remote workers to particularly invest more to align actual work with how it is perceived [7, 44].

Our definition of remote knowledge workers closely aligns with Garrett and Danziger [25]'s classification of "fixed-site teleworker," defined as "individuals who work at least one full day a week without traveling to a central office." We focused specifically on knowledge workers since their work is embedded within organizational structures and team dynamics. This focus allows us to more effectively explore the socially and professionally consequential nature of remote visibility while avoiding the broader and more varied contexts of freelancing or gig work, where visibility often align with free-market-oriented branding practices. Moreover, knowledge workers largely rely on collaboration technologies to perform their knowledge-intensive activities, in which knowledge—often digitally stored in various data formats—is their main input and output of work [12]. This delineation ensures that our research remains tightly centered on remote and computer-mediated visibility.

2.3 Visibility through collaboration technologies

While remote work is often strongly defined by geographic dispersion, it relies highly on mediation of ICT [24, 25, 50, 61, 68]. Post-COVID-19, ICTs have become crucial in mediating collaboration to a degree that it even has recently become a driver for workers to negotiate the nature of workplace [16].

Olson and Olson categorized these as "collaboration technologies," including communication tools, coordination tools, information repositories, and computational infrastructure, despite the fact that such tools often serve multiple purposes for workers [51]. For instance, Google Docs, primarily an information repository, is also used for meetings due to its multi-author capabilities. In a similar taxonomy, Sarma [61] classifies these tools by functional complexity and purposes: communication, artifact management, and task management.

These technologies are not necessarily just for facilitating communication among workers, but also support them to engage with their work artifacts—digital files that is subject or output of the work—and all other work-related activities. Employees engage in visibility-enabling conversations to showcase their knowledge and expertise enhancing their perceived value for the organization [56]. This is especially enabled by affordances such as persistence and tracability of interactions—e.g., records of past communication, previous file versions, etc.—that afford self presentation among these workers [40].

With recent AI developments, workers face frequent updates in their collaboration technologies, making them increasingly *AI-powered* to de facto revolutionize their tasks and therefore overall productivity [1]. As a result of this transformation, there arises a need for exploring the nuanced dynamics of visibility practices among employees, employers, and the technologies in use. Such dynamics redefines how visibility of employees, projects, tasks, work artifacts, etc. are constructed and seen through available collaboration technologies.

3 Method

3.1 Participants

We conducted semi-structured interviews with 16 remote workers working for organizations in Asia (25%), USA (25%), and Europe (50%). This distribution emerged organically through the recruitment process and the snowball sampling method, ensuring representation from varied organizational contexts and remote work practices. Participants were selected based on three criteria: (1) having a direct contractual relationship with their employer, (2) identifying as remote or hybrid workers, and (3) engaging with location-independent tasks and responsibilities. These criteria were chosen to ensure participants were engaged substantially in remote collaboration within organizational dynamics, aligning with the study's focus on computer-mediated visibility practices.

The initial seven participants were selected from the first author's professional network based on accessibility and alignment with the study's inclusion criteria. To broaden the participant pool and minimize conformity bias, snowball sampling was employed [59]. Original participants were asked to recommend colleagues or peers who met the study criteria but operated in different industries, organizations, or geographical locations. This approach resulted in a diverse sample, with nine additional participants recruited from outside the first author's immediate network, ensuring a range of perspectives and experiences. The first author, who conducted the interviews, decided to conclude the data collection phase once additional interviews no longer generated new insights, indicating that data saturation had been reached. Table 1 shows the demographic information of the sixteen interviewees and the context of their work.

3.2 Procedure

We initially applied and received research ethics approval from our institution review board. We then approached interviewees via email with a general description of the topic. Upon receiving their willingness for participation, we arranged a time for the interview. All interviews took between 45 to 88 minutes. We did not compensate the participants, but we adopted a 'gift of giving' approach. During recruitment, we informed them about donating to a tree-planting initiative on their behalf as a token of appreciation. This approach was selected to both address the complexities of international payments and ensure motivation for a ethical participation.

All the interviews were conducted via video conferencing platform (MS Teams), audio and video recorded and automatically transcribed. The first author validated the transcription for correctness, consistency and anonymity. Interviews were semi-structured allowing our participants to bring their personal perspectives and other reflections regarding visibility in remote teams. We developed blocks of prepared questions with a particular emphasis on personal experiences and concrete examples of their use of collaboration technologies when trying to manage visibility.

We had four main areas of discussion: to understand visibility practices we asked about their (1) experience of making themselves visible and (2) experience of noticing their colleague's visibility practices, to understand the role of technology with regards to psycho-social effects of such practices we asked about (3) their feelings, motivations, and desired goals related to these practices[2].

3.3 Analysis

We analyzed the data using Reflexive Thematic Analysis [8, 9] which allows iterative engagement of researchers with data to "generate" themes. We utilized Atlas.ti for the coding process [3]. The first author took the primary role by coding and constructing initial themes. Co-authors helped review codes and themes through a reflexive process. Our process consisted of (1) data familiarization (throughout the interview process), (2) creating patters of data as codes that are flexibly connected to research questions, (3) constructing initial themes (4) collective review of themes through relationship maps amongst co-authors, (5) converging themes into flexible and adaptable insight .

Our analysis is informed by Actor-Network Theory (ANT), originally developed by Bruno Latour and Michel Callon, which challenges traditional dualism that separate the intentional human mind from the passive material world. ANT emphasizes the active interplay between human and non-human actors in creating socio-material realities, where technologies are seen as active participants rather than mere tools [13, 37]. This perspective informed our reflexive thematic process, leading us to adopt a flat and relational ontology that conceptualizes socio-material configurations as networks and associations.

4 Findings

Through a creative, reflective, and critical engagement with the data, we identified 69 codes derived from 389 quotations, each flexibly connected to our research questions.[4] In the following sections, we elaborate on the two overarching themes aligned with our research questions. In *Theme 1: Technology-Mediated Visibility* (Section 4.1), we discuss visibility practices and the structures enabling them, primarily addressing RQ1. In *Theme 2: Visibility and Psycho-Social Entanglements* (Section 4.2), we explore the psycho-social phenomena associated with these practices, in response to RQ2.

4.1 Theme 1: Technology-mediated visibility

4.1.1 Meeting for visibility. Most of our participants [5] mentioned standing out in online meetings is considered a clear path to higher visibility as an established norm within organizations. P13 received advice from her team lead, *"to speak in the meetings"* and *"to be more involved in the meeting [so] that people see"* her.

Participants show their engagements in meetings through a range of technological features. Some of these strategies seem like equivalents of in-person ones such as readiness behind the camera. P13 also wanted to always be ready for video calls. Therefore, she always changes her outfit and gets prepared in the morning because she thinks that she is *"going to work. So it shouldn't be a problem to turn on the camera."* P16 sees a connection between visibility in meetings and use of video. She said, *"I put my camera on. That way you're kind of more show[ing] face, compared to people who don't."*

[2] Interview guide and questions are available as supplementary material
[3] Code book, quotes, and grounded frequency are available as supplementary material
[4] The codebook is available in the supplementary material.
[5] We use the phrase *'most of our participants'* whenever there are at least 11 participants (roughly 70 %) supporting the statement.

Table 1: Demographic Information of Participants

ID	Job Title	Gender	Career Level	Location	Current Setting	Days Remote
P01*	Product Designer	Male	Senior	Tehran, Iran	Home	3+ Days
P02*	Senior Associate	Male	Mid-Level	Den Haag, Netherlands	Home	Fully Remote
P03	Planning Engineer	Female	Senior	Netherlands	Home	3+ Days
P04*	Software Engineer	Male	Senior	Greece	Home	Fully Remote
P05	IT Project Manager	Female	Mid-Level	Berlin, Germany	Home	Fully Remote
P06	Systems Engineer	Male	Mid-Level	Den Bosch, Netherlands	Home	<3 Days
P07	Plan Engineer	Female	Senior	Gorinchem, Netherlands	Home	3+ Days
P08*	Program Officer	Female	Mid-Level	Philadelphia, USA	Home	Fully Remote
P09	Software Engineer	Male	Senior	San Diego, USA	Home	Occasionally
P10	Business Partner	Female	Entry Level	Princeton, USA	Home	<3 Days
P11*	Research Scientist	Female	Senior	Amsterdam, Netherlands	Home	Fully Remote
P12*	Product Manager	Male	Senior	Tehran, Iran	Home	Occasionally
P13	Crime Advisor	Female	Senior	The Hague, Netherlands	Home	3+ Days
P14	Social Designer	Female	Mid-Level	Eindhoven, Netherlands	Home	Occasionally
P15	UX Designer	Female	Entry Level	Delft, Netherlands	Home	3+ Days
P16	UX Designer	Female	Mid-Level	Goleta, USA	Cafe/Home	Fully Remote

* Although participants may occasionally oversee interns or collaborators upon managers' request, these workers brought explicit and relevant experience in supervising others within remote collaboration contexts.

Some were paying attention to emerging features of collaboration technologies like the parallel-to-meetings chat and in-meeting reactions (e.g. like, clapping, thumbs-up). P08 reported using many of these technologies in combination. She said, *"maybe it's my facial expression, maybe I put something in the chat, maybe I use like the icon in the teams or in the zoom to show a reaction"* because she believed they are all ways for people to know that she is *"not zoning out working from home"*.

Presentation—outcomes, achievements, news—was also often mentioned as specific practices that lead to higher visibility during remote meetings. When we asked about occasions when P10 found herself very visible at work, she pointed to online meetings that she presented her work:

> *"The moments where that happen is when I have a really big presentation because that's really like the bread and butter of visibility in the corporate world." (P10)*

Although meeting-based visibility were mostly centered around work responsibilities, some interviewees also reported utilizing synchronous, semi-synchronous or completely asynchronous social interactions as a way to enough visibility. We were told that activities via company groups and channels lead to higher levels of visibility:

> *"It is always the case [that] if you share personal things about your life with people, you connect easier with them. [You] connect deeper with them and when you connect better, you are more visible to them." (P11)*

4.1.2 Visibility through work artifacts. In addition to more formal and synchronous presentations, sharing work artifacts—any work output such as reports, source codes, project reports, etc.— via asynchronous and semi-synchronous communication channels such as emails and IMs was frequently noted as a visibility practice. P14 mentioned using company Teams channels to show her work and receive feedback: *"I finished my task. Then I send it to the group chat and then I'm like, hey, I'm done like this! This is it! And then I get the reaction like: Oh, super nice, that sort of thing."*

Direct involvement in producing work artifacts enhances visibility and fosters positive impressions, especially in cases which associations between work artifact and contributors are traceable. For isntance, P06 involvement of individuals in the organizations *"normally would result in a document or report or something else tangible."*. P04 also mentioned that:

> *"it's a easier to analyze the effort of the team with tools like JIRA [and] it's very easy to understand what has been done by whom [...] If these are important features—important revenue-wise—everyone will search for you, so you are visible." (P04)*

P11 said: *"if you are doing your tasks the impact is already clear and if you are not it's also clear."* When we asked P02 how he shows himself and his presence in the organization, he said: *"I show this with my work, I try to show it with my work."*

Work artifact-related comments were also recognized as a way of materializing visibility. Such comments go beyond basic communication and manifest the author's personality as well as expertise with regards to certain work-artifact. P09 described their code review system: *"We have a code review system. The code we write must be reviewed by others who leave comments"* showing *"how that person's personality is, how accurate he is, and how carefully he develops the code."* He noted that *"if there was not such a tool such a possibility would not happen."*

General engaging in others work by posting comments, questions, or responses ensures visibility, especially since these interactions are public visible and preserved in tools such as Google docs, Miro, or code review systems. P01 used comments to enhance visibility and acknowledge colleagues' work:

> *"For example, when I saw Miro's board that the researcher had done something, I would go somewhere and give a comment even if I didn't have any. For example, I said, wouldn't it be better if you do something like this? Or if you do something, it's fine. A comment like this so that the person knows that I saw his work." (P01)*

Additionally, our participants pointed to an interesting aspect of visibility linked to proactive engagement mainly through questions: workers who ask relevant questions ("the right questions") become more visible. For P16 people could become visible by "asking questions" because she *"think[s] it shows that [the person is] an active listener and curious."*

This type of visibility practice isn't limited to simple contribution to tangible work artifacts. Being introduced as a point of reference, or contact person of a project or matter also creates some visibility. P09 said: *"if I answered an e-mail, two hundred people would see the e-mail. It means knowing me as the point of contact for this story. Or someone whom I don't know on another team can call me and tell me to check something."*

4.1.3 Visibility by reappropriation. Most participants reported utilizing presence and activity awareness tools to gain visibility. P05 told us that with her previous boss, she *"was in front of laptop the whole time trying to be green"* because if her boss called her, she *"really needed to be there."* P14 also mentioned her calendar as way of showing her availability and hence becoming more visible:

> *"Another way would be my calendar we're using Outlook in that it has the time, the hours that I am working, and it has some free [slots], If I don't have a meeting, you know! That's another way that I'm showing people [that] this is in my working hours, but I am not booked." (P14)*

Participants also employ complex strategies leveraging newer awareness tools across various collaboration technologies. Some participants (3/16) became visible through active sessions in multiple-author-supported platforms like Google Docs, Miro, and Figma. P01 *"would not close the tab of the Google Doc when [he] was done with it"*, giving others a longer period to spot his avatar and see that *"he was there."*

Similar to gaining visibility based on work artifact-related comments (Section 4.1.2), file metadata and version history were utilized to gain visibility. P05 noted that people can learn a lot from file metadata:

> *"So yes, when you work with someone on something, you go there to do your part and you see nobody [has] accessed the file, it's there. I mean, it's next to the name! Everything... Name, date, time..." (P05)*

For some interviewees (3/16), timely responses indicated availability and dedication, and make co-workers or subordinates visible. P02 told us that to evaluate some interns or junior staff he would *"check the email response"* by *"looking at [when] he—the junior staff—responds to that email [and] how long it takes."*

Type	Visibility Practices
Meeting for visibility.	Presenting outcomes and achievements. Utilizing in-meeting chat and reactions. Preparedness behind the camera. Social interaction via channels and groups.
Visibility through work artifacts.	Adding Work-related comments. Sharing work outcomes. Providing to-the-point reflection. Engagement and discussion about others' work. Being a reference point.
Visibility by reappropriation	Utilizing availability status. Timely response to communication. Leaving traces in file metadata. Showcasing busyness.

Table 2: Although visibility practices are hard to meaningfully isolate, we utilized a reflexive process to assigned each practice a category that best showcased the inherit qualities of quotations. However, we acknowledge that some practices have a deeper multi-facet dimension and might belong to more than one category. Table 2 summarizes the practices that our participants mentioned over the course of interviews.

4.2 Theme 2: Visibility and psycho-social entanglements

4.2.1 Building trust and professional growth. We found out that our participants perceive a strong potential in visibility practices to reduce mistrust among supervisors. This usually becomes crucial at the beginning of a career or a new role (5/16). Beyond this initial mistrust, they reported experiencing general mistrust and disbelief in remote working from their co-located colleagues. In this context, visibility practices help fill the trust gap. For instance, a simple use of camera in video calls can potentially fill the trust gap leading through visibility (7/16). P07 said sometimes when people don't turn on the camera she thinks *"maybe they are busy doing something else. They're not concentrating on the meeting or the person who's talking"*.

P02 thought *"if the worker [is] feeling, secure and confident and feels like [he's] being trusted, he needs to less invest time in his visibility."* P08 said that she felt the pressure of being visible in the organization at the beginning of her role but after a while, she already became visible: *"I don't have that pressure because I feel like my image has been built now."*

When mistrust is not an issue, visibility assures seizing future opportunities and career progress. P08 explained, *"you kind of need to make that visibility to make sure that when new opportunities*

comes your names is being raised as suggested." Promotion and career development also came across as motivating driver for visibility. When we asked P09 what he thinks might happen if somebody does not care about his visibility at all, he responded: *"the consequence is that he cannot be promoted easily."*. P03 said if people are not visible in the company promotion does*" not happen for them easily because nobody can trust them very well"*. P10 added that only working hard is not enough and people need to showcase they are *"very well-rounded"* because *"people are not always promoted based on the merit."* P13 also pointed to financial consequences of being visible, she said: *"if you [are] seen you get paid well. I would say this is a very direct line between the promotion both financially and also in the hierarchy of the organization."*

4.2.2 Gaming and showmanship. Although visibility at work seems to be perceived as a contributor to career development, most of our participants pointed out that workplace visibility is not correlated with the actual quality of performance and should be perceived separately. However, they mentioned that many workers gain more visibility than their actual performance deserve. P14 thought, if *"somebody is more visible than the other. It doesn't mean, that they're working better or working more."* P13 said that visibility is not the only indicator of performance because it is hardly possible to *"distinguish between the people who are just presenting [or] just working on their marketing part and the people who really do the job."* P04 blamed the corporate culture: *"In some corporations, in many cases, they reward what is more visible and not what makes more sense and what is more important."*

Our participants also framed over-emphasizing on work outcomes and achievements for gaining visibility as a form of showmanship or *show-off* (P01). P15 shared feeling negatively about a colleague of heres when she would*" get into kind of the nitty gritty, even though none of [them would] understand"* to show-off more than to update others. P09 also brought the example of being irritated by her colleague's over-emphasizing on unnecessary details:

> *"[…] he wouldn't say he did [the] task. He would go through the details of implementing this, using these to get [to] that, like all of these technical details that you don't really have to [say]. And it was also really like a misuse of the time of the meeting." (P09)*

Participants also revealed a degree of mistrust about awareness tools. P02 told us that he would pretend to be online through his availability status: *"even if I'm not working. I [am] trying to, with my phone, [to] make sure that I'm shown, that I'm online and I'm standby..."* P16, on the other side, was suspicious about availability status because she thought those were easy to manipulate and hard to trust because *"if you're out for whatever reason and you have Slack on your phone, you can always open Slack on your phone."*

Similarly, some participants (9/16) believed visibility practices can be perceived as showmanship and irritating when the association to work artifacts, as we discussed in Section 4.1.2 is not explicitly clear. P04 said: *"It annoys me if these behaviors occur from people who are not actually doing work."* P10 believed that it should be a balance between efforts for visibility and efforts for actual work:

> *"There's a lot of examples of people that recognize the importance of visibility. But then they don't actually provide substance, so they're just talking. But they're not saying anything of substance, and that is very annoying." (P10)*

4.2.3 The uncertainty of visibility. Our participants referred to an interesting pattern about the uncertain and doubtful nature of visibility as *"something defined by others."* (P14). P10 implied that visibility is only in worker's control but some part of it is actually up to others:

> *"You can try the hardest that you can, but if your leader just doesn't give a s**t about you, then your visibility management won't really feel like it's bringing you anywhere. Even if you're doing it all the right ways and doing all the right things." (P10)*

P06 told us about an occasion when he out-performed in the organization but he only realized through explicit feedback from his supervisors about that. He said, *"I don't think I noticed that a time how visible it was. But very quickly after it happened, I got compliments from a very experienced test engineer and the manager of my department."* P16 also mentioned the vital role of appreciating or highlighting her colleagues in front of others for giving visibility:

> *"[…] If I'm presenting, and I'll be talking about something [then] I would like to refer to her in the call, [I say] she did that with me. We did this. She gave me this idea and perhaps even [by] asking her questions like: can you recall the research that we used for this thing? or perhaps [saying that] she [can] answer [to] this question better!" (P16)*

We found that our participants often rely heavily on explicit feedback and support from colleagues and managers to assure their visibility. P01 told us that as a team lead it is very important to provide clear feedback to his team members to ensure *"that their minds were at ease and their energy was focused on their work rather than worrying about [his] perception of them."*

4.2.4 Fears and internal pressures. Our observations reveal a spectrum of fears, concerns, and internal pressures related to visibility at work. Some of the participants (6/16) expressed *"fears of not being seen"* (P01) at work. P02 told us that he feels that if he doesn't pay attention to his visibility he *"lose trust of the colleagues"* and they might think that he is *"abusing remote working and maybe not working."*

Participants told us that they have fear about consequences of failing to maintain a certain level of visibility. Some participants (3/16) like P11 could see that if she is not *"too visible or trying to be visible [...] it can result in termination"* from the job. Others (5/16) felt worried about their career and though if people don't see ther value they –*"never grow"*. P01 described, *" a psychological fear that no one will see the potential that [he] have and that [he] will not flourish."* Some participants (6/16) like P15 pointed to social repercussions, such as isolation and being "forgotten" if not visible enough.

Finally, the internal "pressure of performance" (P08) and creating favorable professional images was perceived a more significant

driver by some participants (4/16) compared to other internal pressures such as turning the camera on (4/16) which is almost equally present. 4.2.3:

> *"I really feel like maybe the other name for it, is like impostor syndrome, but I really felt this pressure. like, I need to prove to these people that I'm smart. I can think critically. I have a smart things to say and so forth." (P08)*

5 Discussion

Our findings shows a strong relationship between visibility and career progress (Section 4.2.1) as well as links between multiple physco-social phenomena (Section 4.2.4) which can potentially affect employee wellbeing. For instance, workers who want to fill the trust gap by gaining visibility (Section 4.2.1) might experience discomfort due to their high reliance on external assurance about their visibility (Section 4.2.3). This can cause multiple fears and internal pressures (Section 4.2.4) as well as form potentially negative impressions—such as assumption of showmanship (Section 4.2.2)—for their colleagues. Therefore visibility is a significantly multi-facet phenomenon that can impact employees' welbeing in negative ways which makes the design of collaboration technologies vital in accelerating or minimizing such externalities.

Differing standards across social and professional contexts [48] raise concerns around privacy and visibility. Such tensions in remote work settings where the boundary between collaboration and personal space is particularly thinner is challenging more than normally is[27]. Collaboration technologies, as the sole window for interaction for remote workers, not only facilitate remote collaboration but also often serve as tools of extracting data under the guise of visibility. These platforms rely heavily on collecting, processing, and analyzing data which poses privacy risks [34], compelling workers to continually negotiate their digital appearance in alignment with organizational governance and managerial oversight implemented in their organizations [19, 54].

In everyday life, Brighenti [10] introduces the concept of "fair visibility," describing it as a threshold below which individuals risk social exclusion. Hafermalz [33] discusses the "fear of exile," highlighting how remote workers voluntarily subject themselves to surveillance to achieve visibility, driven by a desire for recognition. We illustrate how remote workers often feel compelled to disclose more information to mitigate the risk of being "forgotten" or "unseen" in our findings in Section 4.2.3).

Visibility is inherently contingent on the subjective perceptions of observers [10, 70]. Similarly, Hafermalz [33] introduces the notion of the "managerial gaze," emphasizing how visibility in remote work is ultimately shaped by attempts of supervision. This illuminates that successful workplace visibility is channelized with a specific directionality from managers—as well as co-workers—and ultimately embody in interactions between workers, managers, collaboration technologies, and work artifacts. Thus, we propose a necessary shift in understanding visibility from solely an individual practice enacted by workers to viewing it as a shared socio-material construct involving those who employ visibility-enabling practices, those who attend to such practices, the specific socio-material structures in which these practices are enacted, and the technological environment that shapes and sustains them. Therefore, in the following section, we elaborate on the specific configurations through which workers, managers, and technologies interact when visibility is at stake.

5.1 Understanding the Socio-material Configurations Enabling Visibility

Many of the visibility practices discussed in this paper—such as speaking in meetings or maintaining presence—are well-known and have already been translated into platform features within tools like Zoom, Teams, and Google Docs. These implementations reflect a long-standing trajectory of collaboration technology development aimed at enhancing mutual awareness, often shaped around managerial oversight and coordination logics [32], a trajectory that continues to be critically reflected on in recent work [16]. In contrast, our analysis offers a relational and socio-material lens that moves beyond instrumental or self-help framings [15, 65], revisiting classic groupware concerns stemming from managerial assumptions and control logics through the lens of contemporary entanglements and a socio-material ontology [13, 36].

5.1.1 Meeting-based visibility. As detailed in Section 4.1.1, online meeting structures provide an extensive playground for gaining visibility. Many remote workers still prefer to initiate and maintain their image through these communicative structures. Remote workers often believed most of the ways through which online meetings facilitate visibility can be understood as direct translations of co-located visibility practices. For instance, remote practices such as "speaking out in meetings" or "asking the right question" are identical to the co-located workplace versions and others such as being "well-prepared behind the camera," can be realized as the digital equivalent for traditional visibility practices of wearing a business suit.

However, our finding shows platforms that enable online meetings have substantial agency in reshaping and materializing visibility through new practices. For instance, participants highlighted innovative uses of live emoji reactions and parallel-to-meeting chat as effective visibility practices as backchannels to assure their listenership and engagement without interrupting the primary flow of conversation [46]. Such backchannels maps into a range of practices extending from co-located verbal backchannels, such as frequent affirmations ("yes," "uhm," or "uh huh!"), to remote adaptations like "overcommunication" through instant messages [35].

While to meet people seems like the most obvious way for becoming visible, this type also comes with challenges of such as assumption of gaming and showmanship (Section 4.2.2) where participants crises some co-workers hijacking meetings to gain visibility while not equally contributing to the organizational goal. This leads us to a different configuration where work artifact become more agential in distributing visibility.

5.1.2 Artifact-based visibility. Our findings in Section 4.1.2 reports that collaboration technologies not only support the production of work artifacts but also play a significant role in the visibility of such work artifacts. Work artifacts play a key role in materializing visibility toward their contributors. They stand as a beacon of well-deserved visibility and serve as reliable indicators of a worker's

contributions and expertise to the organization. Moreover when the visibility is stemming from artifact, it acts as a grounded counter argument for potential assumptions of superficial visibility reported as *showmanship* (Section4.2.2). For instance, over-presentation can lead coworkers to perceive performative showmanship; however, a strong contribution, a quality comment, or a critical question linked to a work artifact can help dispel such negative impressions. This potential to mitigate negative assumptions motivate workers to remain discoverable traces between themselves and tangible outputs ensuring their contributions are seen as reflective of their quality work, expertise, and value to the organization.

Artifact-based relays on non-human work artifacts to gain visibility which shifts away from traditional notions of visibility tied to physical presence, availability, and interpersonal communication. Since collaboration technologies enable traceability and accessibility of work artifacts over time, these artifacts find an extended temporality giving multiple chances to contributors for gaining visibility over the course of collaboration.

5.1.3 Reappropriation-based visibility. Previous research points out that remote workers utilize collaboration technologies for different purposes than originally intended [51, 61]. Awareness tools—such as availability status, when frequently updated, or shared calendar when broadcasting "busyness"—although initially intended to provide mutual awareness to facilitate efficient collaboration [31], are obvious choices for remote knowledge gain remote visibility as we saw in Section 4.1.3.

Moreover, code review systems, multi-author documents, and virtual whiteboards are primary designed to facilitate authorship, change management, ideation, or brainstorming [51]. However, such systems become easily reappropriated for gaining visibility as well. For instance, as we saw in Section 4.1.3, remote workers reappropriate existing features of awareness tools to for preserving their own visibility: presence indicators are gamed to project an image of constant attention; timestamps are used to give an impression of dedication. This reapproprition means that features originally used for a miscellaneous purpose come to serve workplace visibility—just as commenting lines of code shifted from being a mean for higher efficiency in collaboration and change management to a marker of knowledge and merit of commentator (Section 4.1.2). In such configurations visibility is often constructed through ill fitting features, that give a particular view of visibility and undermine the original intent of the feature. This *visibility parasitism* tacitly embeds ideas of productivity and attention into the social fabric of the organization and accelerate blurring the lines between genuine activity and performative actions without explicit intention. Moreover, workers do not always find such double-purposed practices of their colleagues honest and therefore question the merit or entitlement of achieved visibility and effectiveness of technology. as multiple participants expressed concern that some may exploit system (e.g. keeping apps open on their phones to falsely appear online) in Section 4.2.2 when we reported insight about gaming systems to gain visibility.

5.2 Towards Visibility Ecosystems

Rather than the seeing visibility through practices done by workers to become seen in workplace, we conceptualize visibility as a phenomenon actively co-constructed by human and non-human actors within socio-material entanglements. Agency is thus decentralized: workers, collaboration tools, artifacts, visibility practices, and managers are the equally shape visibility.

We propose a conceptual framing we term *visibility ecosystem* that looks at the relations and interactions between multiple actors within a collaborative ICT environments shaping the ground for constructing visibility. Drawing on Actor-Network Theory [37] and the notion of "assemblages" [45], which emphasize the heterogeneous, affective, and emergent nature of socio-material relations, we conceptualize visibility as a distributed and relational phenomenon. This conceptualization aligns with a line of contemporary design research, which underscores the active role of non-human actors in shaping human experiences within fluid assemblages [26, 57] where collaboratively perform activities [23].

Our ecosystemic framing of visibility accounts for the complex interplays of action and agency that occur not just between humans but also through artifacts and digital platforms that structure workplace visibility. We intentionally decenter human agency to emphasize how technologies actively shape the construction of visibility, rather than merely serving as passive tools.

Visibility Ecosystem provides a nuanced understanding of visibility as an outcome of socio-material entanglements. Workers, situated within this ecosystem, engage with established and emerging practices to achieve visibility. An ecosystemic lense to interpret workplace visibility captures the way that visibility is enacted by managers, co-workers, or even algorithmic systems, and how visibility practices materialize into organization-wide recognition. Collaboration technologies enable relational forces between workers, managers, and visibility practices, essential for transforming visibility practices into meaningful organizational exposure and acknowledgment. By highlighting the interplay between human and non-human actors, it gives a holistic understanding about how remote knowledge workers ultimately manage their workplace visibility. For instance, a remote worker might combine the use of well-prepared video communication in meetings (meeting-based visibility) and combine it with showcasing detailed contributions to a shared documents (artifact-based visibility), to maximize their chance of gaining visibility. In Figure 3 we illustrate various configurations in which elements of visibility ecosystem are assembled to materialize visibility. This framing can better support consious design interventions addressing not only individual self-presentation practices but also the broader network that governs the production of workplace visibility [23, 26, 57].

The *visibility ecosystem* also resonates with insights from practice theory, which provides a framework for understanding the relational and emergent nature of socio-material practices [66]. Practice theory emphasizes how actions, materials, and contexts are interconnected in shaping organizational phenomena, directly resonating with the ecosystem's focus on the interplay of workers, managers, tools, and artifacts in constructing visibility. This perspective highlights the active role of artifacts such as dashboards and collaboration technologies, not merely as mediators but as co-constitutors of visibility practices similar to what Nicolini [47] draws on as "textures of interconnected practices" instead of static entities. At the core, our approach links to the argument that organizational phenomena—such as hierarchies, power structures, and

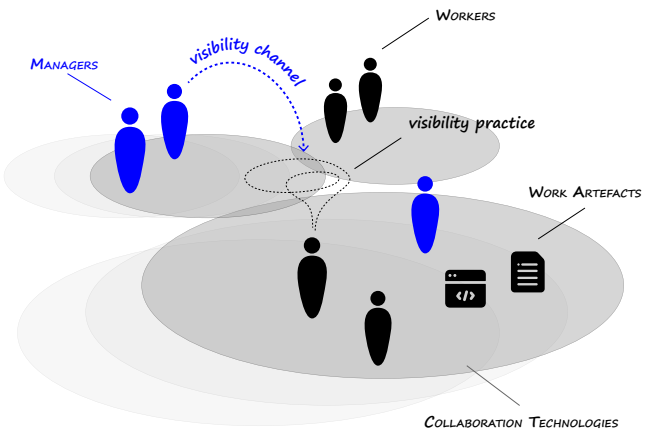

Figure 2: Key components of the visibility ecosystem

(1) **Workers:** The interactions, feedback, and impressions of workers—mediated through collaboration technologies, work artifacts, and managerial oversight—form a dynamic environment where visibility is continually practiced, negotiated, and assessed.
(2) **Managers:** Managers initiate attentive procedures that crystallize visibility practices into **recognized visibility**. Without the active participation of managers, visibility practices might fail to materialize into meaningful recognition.
(3) **Work Artifacts:** Work artifacts serve as tangible evidence of contributions, anchoring visibility to material outputs rather than just social presence. These artifacts act as proxies for human assessment, influencing how contributors' efforts are evaluated, traced, and acknowledged.
(4) **Collaboration Technologies:** These mediate and record workplace interactions, providing the infrastructural foundation for workers' visibility practices. They enable visibility through various **functionalities**, including video conferencing, awareness tools, activity logs, and in-meeting reactions.
(5) **Visibility Channels:** The pathways by which visibility can be materialized through interactions between workers, managers, artifacts, or practices enabled by collaboration technology.
(6) **Visibility Practices:** Visibility practices are temporal and emergent activities that workers engage in along the channels of visibility involving both human and non-human actors, . These practices are not fixed elements of the visibility ecosystem but rather emergent properties of socio-material interactions between workers, work artifacts, managers, and technologies. (See Table 2 for examples.)

institutional arrangements—emerge from the ongoing interaction between actors similar to parts of an ecosystem. We chose this approach intentionally to ensure an emphasis on the material world and non-human agency—dimensions that are less foregrounded in discourse regarding power dynamics of workplaces—not to dismiss its contributions, but to complement and expand its scope with a practice-based perspective.

Finlay, we tend to think workplace visibility situated in an ecosystem of humans and non-human technologies because this eosystemic lens best captures the dynamic nature of workplace visibility. For instance through adversarial construction, workers frequently adopt competitive strategies to prioritize presence over substance (Section 4.2.2), such as dominating discussions with visibility-focused verbal communication that detract from meaningful engagement. Additionally, visibility practices often exhibit parasitic and predatory dynamics, where organizational structures are exploited to utilize artifacts for personal visibility gains (Section 5.1.2) or to overshadow substantive contributions using presence indicators (Section 5.1.3) which ultimately undermine the original intentions behind those technological features and cause trust issues about validity of such technologies. We also see an stigmergic aspect in the ICT environment when it turns to workplace visibility, as workers strategically leave traces—comments, edits, or activity patterns—across tools and documents, creating an environmental record designed to influence perceptions. This framing effectively emphasizes how visibility is continuously negotiated and co-constructed through socio-material entanglements.

While we have constructed this based on looking at remote workers, we feel that this framing can be useful in other contexts. Remote work makes this phenomenon particularly apparent through the use of collaboration technologies, but is otherwise not categorically different from other kinds of work in the need to create visibility ecosystemically.

5.3 Designing for visibility ecosystem

We explored various socio-material aspects of visibility practices from which we derive key design takeaways. This is a gateway to how our insight and particular *ecosystemic* framing of workplace visibility can have implications for the design of collaboration technologies. We aim that our situated socio-material framing help reduce the negative externalities associated with design interventions since it make the interrelations of people, technologies and practices more explicit and situated within networked dynamic.

5.3.1 Designing Visibility as a Shared Organizational Practice, Not an Individual Burden. Our findings reveal that workers struggle with the uncertainty of visibility—they invest effort in becoming visible, yet they lack clear feedback on whether these efforts are recognized (Section 4.2.3). Additionally, workers are frequently evaluated based on external perceptions, creating an asymmetry resulting from certain directionality of visibility as we discussed with regards to how 'managerial gaze' and attentive forces in Section 5. At the same time, some workers rely on colleagues for visibility reinforcement, such as referencing each other's work in meetings (Section 4.1.2). However, such peer validation is informal and inconsistent, leaving many workers still feeling unseen and invisible (Section 4.2.4).

To address this, by looking at how relations are established through a ecosystemic lens, the design can shift from individual visibility practices to collective visibility reinforcement by:

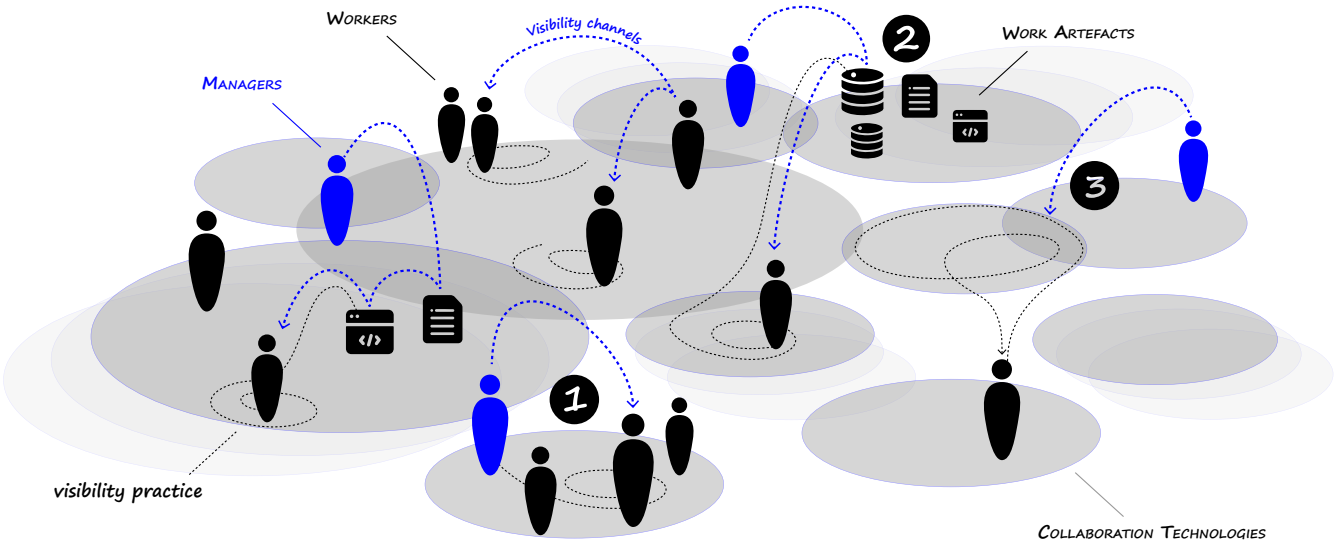

Figure 3: Visibility ecosystems show the interplay of workers, managers, collaboration technologies, and work artifacts. (1) Workers gain visibility through communication in meeting configurations. (2) Quality work artifacts bring visibility to their contributors. (3) Workers reappropriate collaboration technologies to gain visibility.

(1) Embedding visibility acknowledgments into everyday workflows, where design affordances lead colleagues and managers to formally recognize contributions in shared documents, messaging platforms, and project management tools.
(2) Designing structured visibility-sharing mechanisms, where teams can surface and highlight meaningful contributions during regular check-ins, rather than relying solely on managerial oversight.
(3) Providing transparent visibility dashboards that aggregate individual and team contributions, allowing workers to better understand how their efforts are perceived while ensuring visibility is not concentrated among the most vocal participants.

By positioning visibility as a shared practice rather than an individual burden, these features reduce reliance on self-promotion and help workers build sustained visibility without performative pressure.

5.3.2 Strengthening Artifact-Based Visibility to Reduce Dependence on Synchronous Presence. A central theme in our ecosystemic lens is that work artifacts—documents, project reports, and structured contributions—have noticeable agency in distributing visibility among workers (Section 4.1.2). Unlike synchronous visibility (e.g., speaking in meetings), artifact-based visibility provides persistent traces of work, allowing workers to gain recognition based on their knowledge and expertise rather than their presentation or interpersonal communication skills (Section 4.1.1). However, our findings suggest that artifact-based contributions are often undervalued compared to synchronous verbal participation, leading workers to overemphasize presence-based strategies for visibility (Section 4.2.2). We encourage design to strengthen artifact-based visibility by:

(1) Making contribution traces more explicit and enduring, ensuring that authorship and input in shared documents remain visible even as projects evolve and over the course of collaboration.
(2) Introducing contextual visibility signals, such as highlighting contributions in project dashboards or meeting summaries, ensuring that artifact-based visibility is recognized alongside verbal engagement.
(3) Providing visibility dashboards that focus on work artifacts and their contributors fosters equitable recognition, particularly for individuals with strict privacy preferences or limited engagement in social interactions, ensuring their contributions are acknowledged within collaborative environments

By reinforcing artifact-based visibility, collaboration technologies can help workers gain recognition through their expertise and contributions rather than having to perform visibility through synchronous participation (Section 5.2) and potentially minimize the harms stemming from privacy visibility tensions (Section 5).

5.3.3 Rebalancing Visibility Incentives to Avoid Performative Engagement and Visibility Gaming. Our study identifies tensions between meaningful visibility and performative visibility—some workers feel pressured to over-communicate in meetings or artificially maintain an online presence to appear engaged (Section 4.1.3). Others expressed frustration that visibility does not always correlate with actual contributions, as some workers gain visibility through self-promotion rather than substantive work (Section 4.2.2). Additionally, the potentiality of gaming certain presence-awareness features

(e.g., leaving collaboration tools open longer than necessary) to signal activity without meaningful engagement cause mistrust issues for co-workers and managers (5.1.3). As we witness a tendency in our participants to devalue such reappropriation toward meaningful indicators of work (e.g., artifact-based) we propose that design accompany these pattern by:

(1) Limiting generation and availability of simplistic metrics (e.g., meeting speaking time, online presence duration, response time) and instead provide affordances to broadcast qualitative contributions to discussions, organizational goals and work artifacts.
(2) Creating visibility summaries that reflect sustained impact over time, ensuring that visibility is measured through long-term contributions rather than immediate presence signals.

By redefining how visibility is assessed and rewarded, these interventions prevent visibility from becoming a competition—coming with technological tricks—and instead encourage meaningful engagement that aligns with workers' actual contributions.

5.3.4 Speculating about the reappropriation of collaboration tools for visibility showmanship. Our findings suggest that visibility practices can become parasitic, where workers strategically repurpose technological affordances, hijack them to gain visibility. This often undermine the intended purpose and devalue the effectiveness of such technological availability. Similar to how instant messaging (IM) status indicators can be misinterpreted or manipulated (Section 4.1.3), almost any other tool can be reappropriated when visibility is at stake. This creates a cat-and-mouse cycle, where design interventions in favor of nuance, transparency or trust may inadvertently foster new forms of performative visibility.

We urge designers to critically evaluate how their interventions may be reappropriated within the workplace visibility ecosystem. This applies to all design implications proposed in this section. Rather than addressing visibility—or any design intention beyond visibility—in isolation, design approaches should account for their broader socio-material entanglements within organizational contexts and beyond. Our analysis strongly supports the notion that nearly every technological solution can be reappropriated for visibility, often introducing unforeseen challenges. Consequently, more conscientious and contextually grounded design interventions are necessary to mitigate unintended negative externalities that may emerge from new developments in collaboration technologies.

5.4 Limitations

Our study highlights visibility management practices among remote knowledge workers but comes with limitations. First, our sample included participants who successfully managed visibility in remote work, potentially biasing our findings toward more skilled or resourceful individuals. Future studies should include participants struggling with visibility to capture a broader spectrum of experiences.

Second, as an exploratory study, our findings aim to spark further inquiry rather than confirm hypotheses. Future research should adopt confirmatory methodologies to validate and generalize these insights across diverse settings.

Finally, we have constructed *visibility ecosystem* based on the experiences and practice of remote knowledge workers primarily in order to decenter from co-located visibility practices and focus on the role of ICT. However we see a significant relevance of our visibility ecosystem (Section 5.2) for anytime of remote work or even workers in co-located workplaces. This however is subject to further inquiry to investigate how this particular socio-material frame can vary in co-located settings compared to remote ones.

6 Conclusion

This study provides an in-depth exploration of workplace visibility, uncovering the socio-material complexities of how visibility is constructed, maintained, and negotiated in the workplace. By introducing the *visibility ecosystem*, we offer a conceptual framework that encapsulates the interplay between human and non-human actors, collaboration technologies, and organizational structures. This framing highlights the dynamic and relational nature of workplace visibility practices, positioning it within broader socio-material assemblages of organizational culture.

Our findings demonstrate that while visibility is crucial for career progression and trust-building, it also introduces significant challenges, including internal pressures, fears of being unseen, and tensions around performative showmanship. Notably, many participants initially perceived little difference between in-person visibility practices and those through collaboration technologies, underscoring the need for greater awareness of how technological mediation reshapes these dynamics. Our study offers a nuanced perspective that moves beyond superficial online advices—often framed as "mastering online visibility while working remotely"—by recognizing the agency of technological mediation and network of interrelated actors within organizations.

The implications of this research extend to the design of collaboration tools, advocating for technologies that actively support transparent and equitable visibility. Designers must carefully balance the benefits of visibility—enabling tools with their unintended consequences, incorporating conscious approaches to anticipate and mitigate potential harms that might distribute unevenly between multiple components involved when visibility is at stake.

The integration of AI systems—such as emotion recognition—into workplace practices often reinforces hierarchical control rather than empowering workers [58], exacerbating tensions associated with workplace surveillance and visibility. A persistent and active artificial gaze, as framed by Gould [29] through the concept of 'stochastic witnesses,' has the potential to redefine visibility through opaque and biased decision-making processes [55], compelling workers to further conform their behaviors to align with machine-driven evaluations [39, 41]. These developments intensify the precariousness of attaining 'sufficient' visibility, making it increasingly contingent on subjective and algorithmically mediated judgments, thereby generating a range of psychosocial externalities for workers. We advocate for further exploration of AI and machine learning within the visibility ecosystem, particularly concerning value tensions and ethical implications. In this regard, the visibility ecosystem provides a conceptual framework for understanding the co-constructed nature of visibility as it emerges from the interplay between human and algorithmic agents in distributed workplaces. As collaboration technologies continue to evolve, so too must our understanding of

workplace visibility, ensuring that these systems promote both individual and organizational development while safeguarding worker autonomy and well-being.

Acknowledgments

This publication was supported by the AI Futures Lab on Rights and Justice which is part of the TU Delft AI Labs program.

References

[1] G. Abuselidze and L. Mamaladze. 2021. The impact of artificial intelligence on employment before and during pandemic: A comparative analysis. *Journal of Physics: Conference Series* 1840, 1 (March 2021), 012040. doi:10.1088/1742-6596/1840/1/012040 Publisher: IOP Publishing.

[2] Esraa Al-Shatti and Marc Ohana. 2021. Impression Management and Career Related Outcomes: A Systematic Literature Review. *Frontiers in Psychology* 12 (July 2021), 701694. doi:10.3389/fpsyg.2021.701694

[3] Zoe I. Barsness, Kristina A. Diekmann, and Marc-David L. Seidel. 2005. Motivation and Opportunity: The Role of Remote Work, Demographic Dissimilarity, and Social Network Centrality in Impression Management. *Academy of Management Journal* 48, 3 (June 2005), 401–419. doi:10.5465/amj.2005.17407906

[4] Surawski Bartosz. 2019. Who is a "knowledge worker" – clarifying the meaning of the term through comparison with synonymous and associated terms. *Management* 23, 1 (2019), 105–133. https://ideas.repec.org//a/vrs/manmen/v23y2019i1p105-133n7.html Publisher: Sciendo.

[5] Sebastian K. Boell, Dubravka Cecez-Kecmanovic, and John Campbell. 2016. Telework paradoxes and practices: the importance of the nature of work. *New Technology, Work and Employment* 31, 2 (2016), 114–131. doi:10.1111/ntwe.12063 _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/ntwe.12063.

[6] Mark Bolino, David Long, and William Turnley. 2016. Impression Management in Organizations: Critical Questions, Answers, and Areas for Future Research. *Annual Review of Organizational Psychology and Organizational Behavior* 3, 1 (2016), 377–406. doi:10.1146/annurev-orgpsych-041015-062337 _eprint: https://doi.org/10.1146/annurev-orgpsych-041015-062337.

[7] Judith Willemijn Borghouts, Gloria Mark, Alex C. Williams, and Thomas Breideband. 2022. Motivated to Work or Working to Stay Motivated: A Diary and Interview Study on Working From Home. *Proceedings of the ACM on Human-Computer Interaction* 6, CSCW2 (Nov. 2022), 396:1–396:26. doi:10.1145/3555121

[8] Virginia Braun and Victoria Clarke. 2019. Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health* 11, 4 (Aug. 2019), 589–597. doi:10.1080/2159676X.2019.1628806 Publisher: Routledge _eprint: https://doi.org/10.1080/2159676X.2019.1628806.

[9] Virginia Braun and Victoria Clarke. 2021. One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology* 18, 3 (July 2021), 328–352. doi:10.1080/14780887.2020.1769238 Publisher: Routledge _eprint: https://doi.org/10.1080/14780887.2020.1769238.

[10] Andrea Brighenti. 2007. Visibility: A Category for the Social Sciences. *Current Sociology* 55, 3 (May 2007), 323–342. doi:10.1177/0011392107076079 Publisher: SAGE Publications Ltd.

[11] US Census Bureau. 2022. The Number of People Primarily Working From Home Tripled Between 2019 and 2021. https://www.census.gov/newsroom/press-releases/2022/people-working-from-home.html Section: Government.

[12] Tom Butler and Ciaran Murphy. 2006. Work and Knowledge:. In *Encyclopedia of Knowledge Management*, David Schwartz (Ed.). IGI Global, Hershey, PA, USA. http://services.igi-global.com/resolvedoi/resolve.aspx?doi=10.4018/978-1-59140-573-3.ch116

[13] Michel Callon. 1986. The Sociology of an Actor-Network: The Case of the Electric Vehicle. In *Mapping the Dynamics of Science and Technology: Sociology of Science in the Real World*, Michel Callon, John Law, and Arie Rip (Eds.). Palgrave Macmillan UK, London, 19–34. doi:10.1007/978-1-349-07408-2_2

[14] Matthew Carrasco and Andruid Kerne. 2018. Queer Visibility: Supporting LGBT+ Selective Visibility on Social Media. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18)*. Association for Computing Machinery, New York, NY, USA, 1–12. doi:10.1145/3173574.3173824

[15] Kristine Dery and Ella Hafermalz. 2016. Seeing Is Belonging: Remote Working, Identity and Staying Connected. In *The Impact of ICT on Work*, Jungwoo Lee (Ed.). Springer, Singapore, 109–126. doi:10.1007/978-981-287-612-6_6

[16] Melanie Duckert and Pernille Bjørn. 2024. Revisiting Grudin's eight challenges for developers of groupware technologies 30 years later. *i-com* 23, 1 (April 2024), 7–31. doi:10.1515/icom-2023-0039 Publisher: Oldenbourg Wissenschaftsverlag.

[17] Christopher L. Erickson and Peter Norlander. 2022. How the past of outsourcing and offshoring is the future of post-pandemic remote work: A typology, a model and a review. *Industrial Relations Journal* 53, 1 (2022), 71–89. doi:10.1111/irj.12355 _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/irj.12355.

[18] Mikkel Flyverbom. 2016. Digital Age| Transparency: Mediation and the Management of Visibilities. *International Journal of Communication* 10, 0 (Jan. 2016), 13. https://ijoc.org/index.php/ijoc/article/view/4490 Number: 0.

[19] Mikkel Flyverbom. 2022. Overlit: Digital Architectures of Visibility. *Organization Theory* 3, 3 (July 2022), 26317877221090314. doi:10.1177/26317877221090314 Publisher: SAGE Publications Ltd.

[20] Kathryn L. Fonner and Michael E. Roloff. 2010. Why Teleworkers are More Satisfied with Their Jobs than are Office-Based Workers: When Less Contact is Beneficial. *Journal of Applied Communication Research* 38, 4 (Nov. 2010), 336–361. doi:10.1080/00909882.2010.513998 Publisher: Routledge _eprint: https://doi.org/10.1080/00909882.2010.513998.

[21] Eureka Foong. 2020. Understanding and Designing Sociotechnical Systems to Support the Impression Management Practices of Online Freelance Workers. In *Companion Proceedings of the 2020 ACM International Conference on Supporting Group Work (GROUP '20)*. Association for Computing Machinery, New York, NY, USA, 25–33. doi:10.1145/3323994.3371017

[22] Eureka Foong, Nicholas Vincent, Brent Hecht, and Elizabeth M. Gerber. 2018. Women (Still) Ask For Less: Gender Differences in Hourly Rate in an Online Labor Marketplace. *Proceedings of the ACM on Human-Computer Interaction* 2, CSCW (Nov. 2018), 53:1–53:21. doi:10.1145/3274322

[23] Christopher Frauenberger. 2019. Entanglement HCI The Next Wave? *ACM Transactions on Computer-Human Interaction* 27, 1 (Nov. 2019), 2:1–2:27. doi:10.1145/3364998

[24] Mary Elizabeth Watson Fritz, Kunihiko Higa, and Sridhar Narasimhan. 1995. Toward a telework taxonomy and test for suitability: A synthesis of the literature. *Group Decision and Negotiation* 4, 4 (July 1995), 311–334. doi:10.1007/BF01409777

[25] R. Kelly Garrett and James N. Danziger. 2007. Which Telework? Defining and Testing a Taxonomy of Technology-Mediated Work at a Distance. *Social Science Computer Review* 25, 1 (Feb. 2007), 27–47. doi:10.1177/0894439306293819

[26] Elisa Giaccardi and Johan Redström. 2020. Technology and More-Than-Human Design. *Design Issues* 36 (Sept. 2020), 33–44. doi:10.1162/desi_a_00612

[27] Patrice Godefroid, James D. Herbsleb, Lalita Jategaonkar Jagadeesany, and Du Li. 2000. Ensuring privacy in presence awareness: an automated verification approach. In *Proceedings of the 2000 ACM conference on Computer supported cooperative work (CSCW '00)*. Association for Computing Machinery, New York, NY, USA, 59–68. doi:10.1145/358916.358963

[28] Erving Goffman. 1959. *The Presentation of Self in Everyday Life*. Knopf Doubleday Publishing Group, Garden City, NY, USA.

[29] Sandy J. J. Gould. 2024. Stochastic Machine Witnesses at Work: Today's Critiques of Taylorism are Inadequate for Workplace Surveillance Epistemologies of the Future. In *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI '24)*. Association for Computing Machinery, New York, NY, USA, 1–12. doi:10.1145/3613904.3642206

[30] Tomika W. Greer and Stephanie C. Payne. 2014. Overcoming telework challenges: Outcomes of successful telework strategies. *The Psychologist-Manager Journal* 17, 2 (May 2014), 87–111. doi:10.1037/mgr0000014

[31] Tom Gross. 2013. Supporting Effortless Coordination: 25 Years of Awareness Research. *Computer Supported Cooperative Work (CSCW)* 22, 4 (Aug. 2013), 425–474. doi:10.1007/s10606-013-9190-x

[32] Jonathan Grudin. 1994. Groupware and social dynamics: eight challenges for developers. *Commun. ACM* 37, 1 (Jan. 1994), 92–105. doi:10.1145/175222.175230

[33] Ella Hafermalz. 2021. Out of the Panopticon and into Exile: Visibility and control in distributed new culture organizations. *Organization Studies* 42, 5 (May 2021), 697–717. doi:10.1177/0170840620909962

[34] Anna Jobin, Marcello Ienca, and Effy Vayena. 2019. The global landscape of AI ethics guidelines. *Nature Machine Intelligence* 1, 9 (Sept. 2019), 389–399. doi:10.1038/s42256-019-0088-2 Publisher: Nature Publishing Group.

[35] Benjamin Koehne, Patrick C. Shih, and Judith S. Olson. 2012. Remote and alone: coping with being the remote member on the team. In *Proceedings of the ACM 2012 conference on Computer Supported Cooperative Work (CSCW '12)*. Association for Computing Machinery, New York, NY, USA, 1257–1266. doi:10.1145/2145204.2145393

[36] Bruno Latour. 1996. On actor-network theory: A few clarifications. *Soziale Welt* 47, 4 (1996), 369–381. https://www.jstor.org/stable/40878163 Publisher: Nomos Verlagsgesellschaft mbH.

[37] Bruno Latour and Bruno Latour. 2007. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford University Press, Oxford, New York.

[38] Chia Hsin (Josette) Lee and Chien Wen (Tina) Yuan. 2024. The Hidden Toll of Instant Messaging Use in Remote Work: Interaction Dynamics Between Subordinates and Supervisors. In *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI '24)*. Association for Computing Machinery, New York, NY, USA, 1–15. doi:10.1145/3613904.3642913

[39] Paul M. Leonardi. 2021. COVID-19 and the New Technologies of Organizing: Digital Exhaust, Digital Footprints, and Artificial Intelligence in the Wake of Remote Work. *Journal of Management Studies* 58, 1 (Jan. 2021), 249–253. doi:10.1111/joms.12648

[40] Paul M. Leonardi, Marleen Huysman, and Charles Steinfield. 2013. Enterprise Social Media: Definition, History, and Prospects for the Study of Social Technologies in Organizations. *Journal of Computer-Mediated Communication* 19, 1 (Oct. 2013), 1–19. doi:10.1111/jcc4.12029

[41] Paul M. Leonardi and Jeffrey W. Treem. 2012. Knowledge management technology as a stage for strategic self-presentation: Implications for knowledge sharing in organizations. *Information and Organization* 22, 1 (Jan. 2012), 37–59. doi:10.1016/j.infoandorg.2011.10.003

[42] Phil Lord. 2020. The Social Perils and Promise of Remote Work. doi:10.2139/ssrn.3613235

[43] Jennifer Marlow, Laura Dabbish, and Jim Herbsleb. 2013. Impression formation in online peer production: activity traces and personal profiles in github. In *Proceedings of the 2013 conference on Computer supported cooperative work (CSCW '13)*. Association for Computing Machinery, New York, NY, USA, 117–128. doi:10.1145/2441776.2441792

[44] Paula McDonald, Lisa Bradley, and Kerry Brown. 2008. Visibility in the workplace: still an essential ingredient for career success? *The International Journal of Human Resource Management* 19, 12 (Dec. 2008), 2198–2215. doi:10.1080/09585190802479447 Publisher: Routledge _eprint: https://doi.org/10.1080/09585190802479447.

[45] Martin Müller and Carolin Schurr. 2016. Assemblage thinking and actor-network theory: conjunctions, disjunctions, cross-fertilisations. *Transactions of the Institute of British Geographers* 41, 3 (July 2016), 217–229. doi:10.1111/tran.12117 Publisher: John Wiley & Sons, Ltd.

[46] Duyen T. Nguyen and Susan R. Fussell. 2013. Effect of message content on communication processes in intercultural and same-culture instant messaging conversations. In *Proceedings of the 2013 conference on Computer supported cooperative work (CSCW '13)*. Association for Computing Machinery, New York, NY, USA, 19–32. doi:10.1145/2441776.2441782

[47] Davide Nicolini. 2009. Zooming In and Out: Studying Practices by Switching Theoretical Lenses and Trailing Connections. *Organization Studies* 30, 12 (Dec. 2009), 1391–1418. doi:10.1177/0170840609349875 Publisher: SAGE Publications Ltd.

[48] Helen Nissenbaum. 2004. Privacy as Contextual Integrity. *Washington Law Review* 79, 1 (Feb. 2004), 119. https://digitalcommons.law.uw.edu/wlr/vol79/iss1/10

[49] Niina Nurmi, Petra Bosch-Sijtsema, Anu Sivunen, and Renate Fruchter. 2009. Who shouts louder? exerting power across distance and culture. In *Proceedings of the 2009 international workshop on Intercultural collaboration (IWIC '09)*. Association for Computing Machinery, New York, NY, USA, 71–80. doi:10.1145/1499224.1499237

[50] Gary M Olson and Judith S Olson. 2000. Distance matters. *Human–computer interaction* 15, 2-3 (2000), 139–178. Publisher: Taylor & Francis.

[51] Judith S. Olson and Gary M. Olson. 2014. Collaboration Technologies and Their Use. In *Working Together Apart: Collaboration over the Internet*, Judith S. Olson and Gary M. Olson (Eds.). Springer International Publishing, Cham, 57–85. doi:10.1007/978-3-031-02203-6_9

[52] Margrethe H. Olson. 1983. Remote office work: changing work patterns in space and time. *Commun. ACM* 26, 3 (March 1983), 182–187. doi:10.1145/358061.358068

[53] Adam Ozimek. 2020. The Future of Remote Work. doi:10.2139/ssrn.3638597

[54] Leysia Palen and Paul Dourish. 2003. Unpacking "privacy" for a networked world. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '03)*. Association for Computing Machinery, New York, NY, USA, 129–136. doi:10.1145/642611.642635

[55] Hyanghee Park, Daehwan Ahn, Kartik Hosanagar, and Joonhwan Lee. 2021. Human-AI Interaction in Human Resource Management: Understanding Why Employees Resist Algorithmic Evaluation at Workplaces and How to Mitigate Burdens. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (CHI '21)*. Association for Computing Machinery, New York, NY, USA, 1–15. doi:10.1145/3411764.3445304

[56] Muhammad Imran Rasheed, Abdul Hameed Pitafi, Shreya Mishra, and Varun Chotia. 2023. When and how ESM affects creativity: The role of communication visibility and employee agility in a cross-cultural setting. *Technological Forecasting and Social Change* 194 (Sept. 2023), 122717. doi:10.1016/j.techfore.2023.122717

[57] Johan Redström and Heather Wiltse. 2018. *Changing Things: The Future of Objects in a Digital World*. Bloomsbury Publishing, London, UK. Google-Books-ID: Tn9uDwAAQBAJ.

[58] Kat Roemmich, Florian Schaub, and Nazanin Andalibi. 2023. Emotion AI at Work: Implications for Workplace Surveillance, Emotional Labor, and Emotional Privacy. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI '23)*. Association for Computing Machinery, New York, NY, USA, 1–20. doi:10.1145/3544548.3580950

[59] Georgia Robins Sadler, Hau-Chen Lee, Rod Seung-Hwan Lim, and Judith Fullerton. 2010. Research Article: Recruitment of hard-to-reach population subgroups via adaptations of the snowball sampling strategy. *Nursing & Health Sciences* 12, 3 (2010), 369–374. doi:10.1111/j.1442-2018.2010.00541.x _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1442-2018.2010.00541.x.

[60] Mari Sako. 2021. From remote work to working from anywhere. *Commun. ACM* 64, 4 (March 2021), 20–22. doi:10.1145/3451223

[61] Anita Sarma. 2019. Coordination Technologies. In *Handbook of Software Engineering*, Sungdeok Cha, Richard N. Taylor, and Kyochul Kang (Eds.). Springer International Publishing, Cham, 375–398. doi:10.1007/978-3-030-00262-6_10

[62] Bryan Semaan, Bryan Dosono, and Lauren M. Britton. 2017. Impression Management in High Context Societies: 'Saving Face' with ICT. In *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing (CSCW '17)*. Association for Computing Machinery, New York, NY, USA, 712–725. doi:10.1145/2998181.2998222

[63] N. Sadat Shami, Kate Ehrlich, Geri Gay, and Jeffrey T. Hancock. 2009. Making sense of strangers' expertise from signals in digital artifacts. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '09)*. Association for Computing Machinery, New York, NY, USA, 69–78. doi:10.1145/1518701.1518713

[64] Norman Makoto Su and Gloria Mark. 2008. Designing for nomadic work. In *Proceedings of the 7th ACM conference on Designing interactive systems (DIS '08)*. Association for Computing Machinery, New York, NY, USA, 305–314. doi:10.1145/1394445.1394478

[65] Yuan Sun, Shuyue Fang, and Zuopeng (Justin) Zhang. 2021. Impression management strategies on enterprise social media platforms: An affordance perspective. *International Journal of Information Management* 60 (Oct. 2021), 102359. doi:10.1016/j.ijinfomgt.2021.102359

[66] Bartosz Surawski. 2019. Who is a "knowledge worker" – clarifying the meaning of the term through comparison with synonymous and associated terms. *Management* 23 (June 2019), 105–133. doi:10.2478/manment-2019-0007

[67] Agnieszka Matysiak Szostek, Evangelos Karapanos, Berry Eggen, and Mike Holenderski. 2008. Understanding the implications of social translucence for systems supporting communication at work. In *Proceedings of the 2008 ACM conference on Computer supported cooperative work (CSCW '08)*. Association for Computing Machinery, New York, NY, USA, 649–658. doi:10.1145/1460563.1460664

[68] Tywanda D. Tate, Franklin M. Lartey, and Phillip M. Randall. 2019. Relationship between Computer-Mediated Communication and Employee Engagement among Telecommuting Knowledge Workers. *Journal of Human Resource and Sustainability Studies* 7, 2 (April 2019), 328–347. doi:10.4236/jhrss.2019.72021 Number: 2 Publisher: Scientific Research Publishing.

[69] Jaime Teevan, Brent Hecht, Sonia Jaffe, Nancy Baym, Rachel Bergmann, Matt Brodsky, Bill Buxton, Jenna Butler, Adam Coleman, Mary Czerwinski, Brian Houck, Ginger Hudson, Shamsi Iqbal, Chandra Maddila, Kate Nowak, Emily Peloquin, Ricardo Reyna Fernandez, Sean Rintel, Abigail Sellen, Tiffany Smith, Margaret-Anne Storey, Siddharth Suri, Hana Wolf, and Longqi Yang. 2021. *The New Future of Work: Research from Microsoft into the Pandemic's Impact on Work Practices*. Technical Report MSR-TR-2021-1. Microsoft.

[70] Jeffrey W Treem, Paul M Leonardi, and Bart van den Hooff. 2020. Computer-Mediated Communication in the Age of Communication Visibility. *Journal of Computer-Mediated Communication* 25, 1 (March 2020), 44–59. doi:10.1093/jcmc/zmz024

[71] Steven P. Vallas and Angèle Christin. 2018. Work and Identity in an Era of Precarious Employment: How Workers Respond to "Personal Branding" Discourse. *Work and Occupations* 45, 1 (Feb. 2018), 3–37. doi:10.1177/0730888417735662 Publisher: SAGE Publications Inc.

[72] Yuan Wang, Yukun Li, Xinning Gui, Yubo Kou, and Fenglian Liu. 2019. Culturally-Embedded Visual Literacy: A Study of Impression Management via Emoticon, Emoji, Sticker, and Meme on Social Media in China. *Proceedings of the ACM on Human-Computer Interaction* 3, CSCW (Nov. 2019), 68:1–68:24. doi:10.1145/3359170

[73] Sandy J. Wayne and Gerald R. Ferris. 1990. Influence tactics, affect, and exchange quality in supervisor-subordinate interactions: A laboratory experiment and field study. *Journal of Applied Psychology* 75, 5 (1990), 487–499. doi:10.1037/0021-9010.75.5.487 Place: US Publisher: American Psychological Association.