

Technology, Maturity, and Craft: Making Vinyl Records in the Digital Age

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Drawing from Michel Foucault's reading of Immanuel Kant's essay "What is Enlightenment?," and specifically his definition of *ascesis*, we associate maturity with a capacity for, and interest in, forming the self. On the basis of an empirical study of making vinyl records following the successful commercialization of digital media, we identify micro-disciplinary techniques of self-forming that emerge as enthusiasts steadily learn the craft of vinyl record manufacturing. It is, we argue, through technology, rather than against it, that organizational immaturity can be resisted. Craftwork involves testing and transforming, rather than just acquiring, traditional skills. Maturity involves an ongoing struggle of selectively and reflectively engaging with technologies via attempts to be the subject of one's own subjection. The former contributes to the latter.

Key Words: technology, Foucault, ascesis, Heidegger, craft, vinyl, digital, analogue

Whilst the rapidity and spread of digital technology has, on some measures, made some lives more convenient, efficient, and predictable, it has just as powerfully raised the questions of whether these qualities are desirable and at what cost this "comfort" is being bought. It appears that we no longer need to think for ourselves, or of ourselves, outside of technological mediation, nor do we acknowledge the often baleful social and environmental effects of emerging forms of technological ordering. Rather, we slip into a machine-mediated state of immaturity, content to accede to ever-renewing forms of machine-based life.

As we will argue, technology is always with and in us (Beyes, Chun, Clarke, Flyverbom, & Holt, 2022). What we explore is the experience of relating to technology critically, thereby questioning the discourse of technological progress, whilst avoiding an idealized advocacy of premodern relations. We empirically examine what we believe is a particularly revealing case in this respect: the development of craft skill in aspects of analogue, vinyl record making. Though now well established as a renaissance industry (Bartmanski & Woodward, 2020; Haagsma, 2018; Shah, 2014), making vinyl records in the wake of digital recording and production was

regarded as doomed (Qualen, 1985). Left to wither by major record labels promoting the more cheaply produced and distributed compact disc (CD) format upon which new artists appeared even “newer” (cf. Reckwitz, 2017), and the lucrative backlists of established artists could be repackaged, vinyl was taken up by small coterie of amateur enthusiasts.

We draw from Foucault (1984b, 2020) to theorize this enthusiasm as acts of questioning organized immaturity and, subsequently, of developing maturity. Specifically, we show how, by operating at the edges of what is considered normal, appropriate, and valuable, the enthusiasts revealed largely taken-for-granted limits, thereby opening up possibilities for transgression. We reveal how engaging with limit conditions re-forms the mediating force of technology, which, far from being totalizing, is riven with openings for alternatives. We argue that “craft”—a work practice that embraces risk (Pye, 2007) and, through disciplined acquisition of skill, can generate relations of care to things, others, and oneself (Heidegger, 1977)—represents such an alternative: one that, whilst steeped in its own demands of personal and communal dedication to skills and tradition, allows and even insists that such discipline court the open (Ranganathan, 2018; Sasaki, Ravasi, & Micelotta, 2019).

This article thus contributes to an understanding of how organized immaturity can be resisted, and maturity attained, via micro-disciplinary techniques of self-forming (Foucault, 2020: 207–8), ones which we find in craftwork. As such, it resonates with studies on the ethics of resistance (Alakavuklar & Alamgir, 2018) and ethics and contemporary craftwork (Holmes, 2015). It also has practical implications for entrepreneurs and policymakers seeking to support small businesses because it highlights the possibility and viability of adopting a critical stance towards dominant technology narratives without regressing to an idealized and romanticized premodern relationship with technology (Dodd, Wilson, Karampela, & Danson, 2021).

MATURITY, TECHNOLOGY, AND CRAFT

New Technological Media and Maturity

For Michel Foucault, the question of how we maintain any critical sense of self towards which we might feel responsible in this current age of persistent technological mediation and organization is inherently ethical. He directed this question towards the philosophy of ancient Greece. For the pre-Platonic Greeks, self-forming was the conscious making of character (*ethos*) being formed by inquiry into, and imagining alternatives to, the economic, political, and cultural forces defining what was materially and structurally necessary, universal, and obligatory. Rather than a knowledge, *ethos* emerged from critique: it was a self-organized, public examination and moulding of everyday practice through which character formed. To have *ethos* was to struggle with making one’s own justification for existence, and to do so personally, continually, and concretely.

With the pervasiveness of technology, however, notably through work and trade, the striving necessary for self-forming is being concealed by a machine-mediated

calculation of how to subject, use, transform, and improve the human body through training, routines, and spatial control: subjects are distributed in roles, treated as self-similar (and replaceable units), and surveilled for transgression, with the effect that a subject's conscience and self-care become synonymous with the forms of subjectification held in prevailing systems of power and knowledge. The upshot is not homogenization but a wide-ranging panoply of categories covering all manner of specific expression through which normalizing technology extends its reach. Individualization and deviancy are not eradicated; they are categorized and controlled.

Despite the reach of technology, Foucault remained sanguine about the possibilities for self-forming. As Raffnsøe, Mennicken, and Miller (2019) argue, for Foucault, subjectification through technology is far from totalizing, because from within its own organizational instantiations, there is continual dependency on expressive and creative agency to better enact the corrections it demands for its own survival: there is an intense and productive intimacy between power and freedom.

It is in this intimacy between self-forming and subjectification that maturity emerges, not in opposition, but as a style “in which the critique of what we are is at one and the same time the historical analysis of the limits that are imposed on us and an experiment with the possibility of going beyond them” (Foucault, 1984b: 50). Instead of enlisting an essentializing, knowledge-based theory of human nature by which freedom is warranted, maturity legitimates itself without external appeal, and it does so practically and historically (within the conditions of subjectification).

If being mature is facing the critical task of self-forming through continual analysis and experiment, then under one reading, this acquaints maturity with the neoliberal impress to expand the interventionist, competitive dynamic of productivity into all human action (Vallentin & Murillo, 2022): one is reminded, for example, of the controlled circulation of ambition and initiative that characterizes modern human resource management practices (Alakavuklar & Alamgir, 2018; Weiskopf & Munro, 2012). In the requirement to be creative, to innovate, and to make of oneself a project of productive improvement, the transgression of limits becomes itself a limit condition of systems of power and knowledge through which subjectification continues apace, inviting resistance whilst outflanking it (Leclercq-Vandelannoitte, 2019). Foucault acknowledges the risk: power and knowledge always spill into the imprint left by deviations from norms, washing away their distinction, just as a tide smooths the sand. Yet, maturity absorbs the inevitability, with irony, notably, the realization that, in encountering the question of self-forming, all excellence carries ignorance as a partner and so contains the seeds of its own dissolution, whilst also realizing that transgression is itself power.

In his essay “What Is Enlightenment?,” Foucault enlists the poet Charles Baudelaire as an exemplar of such maturity, one whose skilled attentiveness is conferred by his repeatedly goading authority (including the authority of his own craft as a writer) by encouraging it to occupy settings it cannot master. An integral aspect of Baudelaire's craft is that, throughout, a singular question circulates: “What has any of this to do with refinement?” (Foucault, 1984b). This form of self-awareness—being

aware that all forms of excellence shine within their own shadows—refuses to grant the limit conditions circulated in systems of power and knowledge any claim to consistency and purity. Maturity comes from keeping the limits in view, asking of oneself, “What is it that I am being prevented from knowing, feeling, and doing here?” Just in asking, power is released, but always mysteriously, and perhaps uncomfortably. Maturity is a condition to be worked at, not asserted; it is made, not discovered. To paraphrase Foucault’s essay “Truth and Power,” the question for Baudelaire was not error, illusion, or alienation but truth itself and the possibilities of its transformation (Foucault, 1984a: 74–75).

Foucault’s essay on maturity twists Immanuel Kant’s (1784) formal question of Enlightenment—what are the limits that knowledge, morality, and civility must renounce transgressing for them to persist as the ground upon which progress is possible?—into a practical question of their negotiation (Seigel, 1990). Kant (1784) argued that maturity emerged from enlarged (curious about alternatives), unprejudiced (self-reliant and publicly declared), and consistent or consecutive (tolerance of ambiguity) thinking. Immaturity was a cowardly and lazy reliance on habit and others, those he called Guardians, whose authority stemmed from their singular commitment to prevailing orders. As an Enlightenment figure, Kant urged us to be our own guardians by laying the groundwork of our actions upon the formal principles of practical reason. In asking the same question, Foucault (1984b: 45–46) twists Kant’s formality into a condition of critique that registers maturity as an ongoing, historically open struggle, one in which “criticism is no longer going to be practiced in the search for formal structures with universal value, but rather as a historical investigation into the events that have led us to constitute ourselves and to recognize ourselves as subjects of what we are doing, thinking, saying.” Being mature is archaeological in its method: rather than looking for formal, categorical structures (à la Kant’s stubborn reliance on imperatives and metaphysical groundwork), it examines the “many historical events” (Foucault, 1984b: 46) making up the forms of truth, morality, and civility embodied by Guardian-like figures. And it is genealogical in spirit: rather than deducing from fixed theories of human nature what is necessary, desirable, or impossible, it examines the redundancy amidst the contingent (technological) systems of power and knowledge currently limiting what can be said, done, felt, and thought. In this inquiry, the possibility of transgression emerges (Allen, 2003), one that is affective rather than directed (Ladkin, 2018; Munro & Thanem, 2018).

Foucault associates maturity with a sensitivity to what Raffnsøe, Mennicken, and Miller (2019: 175) call “the complex conditions for organizing in the form of an ongoing dynamic and differential structuring of freedom.” This means revealing how what Foucault calls the “perseverance or stubbornness [*intransitivité*] of freedom” and the “insubmissiveness and unmanageability [*rétivité*] of the will” become both sites for subjectification and expressions of its possible transgression (Raffnsøe et al., 2019: 175). Declarations that “this” or “that” is how things are, or should be, make power and knowledge visible, and with the visibility of limits comes curiosity as well as obedience: build a wall, and what follows is an urge to look on the other side.

The Extent of Technological Mediation and Ascesis

The question of whether maturity remains possible in today's highly technologically mediated world is a vexing one, and one Foucault was hesitant to answer on others' behalf. To encounter the limit conditions of the present age requires, perhaps, more than the gilded operations of *flaneurie* used by a nineteenth-century male poet. As we have suggested, and as Peter Sloterdijk (2009: 16) observes, under its modern aegis, "the question of how a person can become a real or true human being becomes unavoidably a media question, if we understand by media the means of communion and communication by which human beings attain to that which they can and will become." And communications are saturated with digital technologies spreading into human practices unnoticed, to the point where human cognition, emotion, and sense are becoming networked into prepersonal orders and encounters of which they have little conscious awareness (Beyes et al., 2022; Hayles, 2017; Thrift, 2005: 212–13).

Amidst such computational constellations, the informed subject—the manager, say, or entrepreneurs engaged in creating new organizational forms—is only seemingly sovereign; it communicates at the behest of communications that are themselves little more than continually updating, machine-based distinctions between signal and noise. As JoAnne Yates (1989) pointed out, management and strategy are reducible to control, control to information, information to communication, and communication to digitized, binary exchange. The informed individual is being formed by machine computation (Chun, 2011: 9)—a development that accelerates history into cycles of ever-renewing presence (there is less and less inclination to pause, think, ponder alternatives) and makes it harder to pursue the distinctions between falsity and truth, reality and simulation (Virilio, 2000: 3).

There remains, however, some space for human subjects. For Hayles (2017: 67), it is a residuum:

If what is exactly stated can be done by a machine, the residue of the uniquely human becomes coextensive with the linguistic qualities that interfere with precise specification—ambiguity, metaphoric play, multiple encoding, and allusive exchanges between one symbol system and another.

Hayles's talk of "residue" seems contestable: it places the subject outside technological mediation, whereas the space offered through maturity, rather than a walled-off space of metaphorical allusiveness, comes from within. As Foucault suggests, technology can provoke critique, and so maturity. Hence Hayles's talk of interference remains spot-on. The interference comes in the form of acknowledging, restraining, and even transgressing the "contemporary limits of the necessary" by which a subject is organized (Foucault, 1984b: 43). The interference happens in various ways, but in relation to the mature qualities of enlarged, consistent, and unprejudiced thought, the technique of *ascesis* is one Foucault brings to the fore.

Munro (2014) likens *ascesis* to micro-disciplinary techniques of self-forming through which a self manages to insert itself into practices of knowledge and power whilst maintaining an intensity of self-awareness (Foucault, 2009: 207–8). They are not controlling, managerial actions and, if claimed in the service of such, quickly

become a pastiche of themselves: to invoke Kant's language, they are not disciplines belonging to would-be Guardians. Indeed, Foucault's association of maturity and irony would preclude *ascesis* being a disciplinary process that led to a form of rugged, independent, resilient distinction—the development of a “strong” character. Rather—and in this sense, we should speak of becoming mature as a process, a struggle, and not a threshold state—*ascesis* is a discipline of self-modification that can bring about decisive but unplanned, unforeseen, and unmanaged effects on oneself. In *ascesis*, Foucault (2009: 229–30) finds a forming of self through thought, writing, and practical action. *Ethos* (character) emerges from a preparedness to continually test the ground and setting of action; it is an obstinate form of curiosity:

not the curiosity that seeks to assimilate what is proper for one to know, but that which enables one to get free of oneself. After all, what would be the value of a passion of knowledge if it resulted only in a certain amount of knowledgeableness and not, in one way or another and to the extent possible, in the knower's straying afield of himself? There are times in life when the question of knowing if one can think differently than one thinks, and perceive differently than one sees, is absolutely necessary if one is to go on looking and reflecting at all (Foucault, 1986: 8).

Ascesis, then, is the struggle to venture outwards beyond the already calculated passageways and territories by which human relations are being continually canalized. In venturing “out,” what matters is not the realization of new certainties but a conscious attempt to defamiliarize oneself with prevailing expectations and to stubbornly inquire into alternative ways of doing things. In escaping from the standards, one becomes aware of one's responsibility towards one's own self. The unquestioned submission to prevailing systems constitutes a form of self-neglect. Through *ascesis*, and its disciplinary demand to confront experience thoughtfully, the affect and effect of technological mediation become apparent, and so questionable. It elicits an art (or craft) of self-fashioning (McGushin, 2007: xviii).

As well as *ascesis*, another related opening for maturity comes from within the operations of technology itself. For Foucault (1991: 79), technology is a pattern that delineates tendencies but which is just as likely to provoke resistance as it is to provoke adherence (Alakavuklar & Alamgir, 2018). Technologies are not annihilating of the self. As much as they dominate, technologies are also partial, precarious, and uncertain in their presence (Neyland, 2019). Technology comes in instances, in patches, each with its own divergent rationality. Indeed, Foucault's agenda is to reveal how, despite a technological impress, we are freer than we feel. Because technology is subject to continual organization—it is not seamless or natural—it has to be sequestered, protected, warranted, aligned, organized, and there are limits to networks (Beyes et al., 2022). All these moves make it more visible and questionable than it was designed to be. When combined, *ascesis* and the partial nature of technological ordering proffer possibilities for encountering and thereby transgressing forms of technological mediation. The possibility is found less in inner reflection than in a deliberate exposure to the multiple settings in which the self conforms, first, with discursive requirements (immaturity) and, second, with deviations from these (maturity).

Craft and Maturity

One practice in which both the micro-disciplinary techniques of self-forming and the realization of the ad hoc and open rather than closed nature of technological mediation become apparent is craftwork (Kroezen, Ravasi, Sasaki, Żebrowska, & Suddaby, 2021). Despite, or perhaps because of, the intensification and globalized spread of technology, we find people embracing often laborious and demanding processes of making, typically by hand, without conforming fully with the institutional logics of efficiency (Bell, Mangia, Taylor, & Toraldo, 2018; Ocejo, 2017; Suddaby, Ganzin, & Minkus, 2017), and embodying traditional, yet often expressive, forms of power and knowledge (Sasaki et al., 2019).

This association of self-forming, technology, and craftwork is perhaps most extensively grounded in Martin Heidegger's texts. Heidegger understood the condition of self-forming as an embodied engagement with things already integrated into purposive, intentional relations and which in turn shape what is being, thought, felt, and acted out. Rather than a subject–object structure, the factual life of self-forming begins as a condition of practical relatedness in which a subject's care for itself cannot be separate from its care for other things (Feenberg, 2017: 140–41; Heidegger, 2008, sec. 12). For Heidegger, to experience care for things is, first, an awareness that our basic relations with things are ones of utility: “a useful thing is essentially ‘something in order to ...’ The different kinds of ‘in order to’ such as serviceability, helpfulness, usability, handiness, constitute a totality of useful things” (sec. 15). Any forming of self occurs from within this already organized totality of useful things. Second arises the struggle to eschew the ease with which such a totality becomes programmatic, thoughtless, and exposed to the machinations of fixed interests.

Heidegger (2008: sec. 71) found craft practice an exemplar of caring relations and, through these, of self-forming. Craftwork allows things to “be” and to be used, but without fully stipulating their significance (by which he means without committing them to programmatic ends aligned to specific interests). He terms it *Hervorbringen* (bringing forth)—a process where makers act, think, and feel alongside “things” as they are revealed in the making and become implicated in them, but without being centre stage and never in ordering command (Heidegger, 1977: 10–11). The significance of things is found in working to let them be, not just in being assigned an explicit classification and role. Activity is both deliberate and loosely experimental: as it ends, new beginnings open up (Heidegger, 2008: sec. 87).

With the onset of globalized technological ordering, however, the possibilities for self-forming are diminished. Things are no longer generative in themselves; they are no longer encountered in relations of significance but instead become self-similar units, arranged in machine-organized chains of means–end calculation whose spread enframes all beings, including human subjects. As “workers,” subjects belong to category roles. There can be a huge variety of such roles, but always ones where subjects remain utterly exposed as objects that will then be set upon by other, equally singular things (think of line management). Under machination, this constituting takes the form of challenging forth (*Herausfordern*) (Heidegger 1977: 15): a setting upon nature in which the relations of mutual indebtedness and co-liability

(*Verschulden*) established in craft have no place. *Herausfordern* enforces singular significance on objects: a qualification, an address, a password, a signature, an office, a title, all of which delineate a specific position in the means–end chain of reasoning. The upshot is “the gathering together of that setting upon that sets upon man, i.e., challenges him forth, to reveal the real, in the mode of ordering, as standing reserve [*Gestell*]” (Heidegger, 1977: 20), where *stellen* means a subjectification that is both setting upon and producing a self:

What does machination mean? That which is released to its own fettering. What are the fetters? The schema of thorough and calculable explainability, whereby everything draws equally close together to everything else and becomes completely foreign to itself, indeed altogether other to itself and not just foreign. The relation of unrelatedness (Heidegger, 2012: 104–5).

Machination is an infinite expansion of (self) making in which things are being compared in measured proximity (the spread of calculability under the organizational aegis of Guardians) and thereby becoming increasingly alien to themselves: the “thing” becomes a unit, a relation, exposed to being something else and something “better” (Heidegger, 2008: sec. 65).

Heidegger suspected relations of care to be dwindling (i.e., where craft reveals itself, it is quickly absorbed into machinations of *Gestell*). Indeed, in his later work, he wrote less of care and craft and far more of the inevitability of machination structuring organized life (Holt & Zundel, 2023). Foucault (1984b: 43), who took attentive note of Heidegger’s thinking (Dreyfus, 1996; Ziarek, 1998), was more sanguine, continuing to suggest possibilities for self-forming, notably in the skilled questioning of limits, or *ascesis*. The question we then ask is whether in craftwork we can find sufficient awareness of limit conditions to constitute a condition of self-forming, and so foster maturity.

METHODS

Our study uses an in-depth, qualitative, longitudinal research design (Miles & Huberman, 1994) to build theory that questions the limits of prevailing technological ordering. Such an approach is appropriate given the lack of existing theory regarding the phenomenon (Morgan & Smircich, 1980). The global vinyl record manufacturing industry after the successful commercialization of the digital audio CD is suitable in this regard because it presents an extreme case in which the dynamics of globalized technological ordering are expected to be particularly prominent (Siggelkow, 2007). “Better” digital technologies, distribution networks, and marketing organized to cast vinyl record making as a dying anachronism.

Research Setting

This section presents a brief outline of historical developments in vinyl record manufacturing from its peak until its virtually complete replacement by digital media production processes. A visual overview and brief description of the vinyl record making process are presented in Appendix A.

Declining Demand

From the beginning of the twentieth century until the early 1980s, analogue discs were the dominant audio format throughout the world. In 1978, approximately fifty pressing plants, many owned by large record labels, operated in the United States alone (Boden, 1978), producing an estimated 530 million vinyl records.¹ However, in the 1980s, vinyl record production and sales began to decline noticeably, and by 1985, more cassettes were shipped within the United States than vinyl records (339.1 million units compared to 287.7 million units, respectively). The audio cassette remained the dominant medium for a few years, until the CD took over with an estimated market of \$4.4 billion in 1991. By this time, the US vinyl record market had shrunk to less than \$100 million, with approximately twenty scaled-down, domestic pressing plants in operation and a total shipping volume of only 26.8 million units. By 2006, this number had dropped to just over 2 million. By then, worldwide vinyl album sales had fallen to 3 million units—less than 0.3 percent of their 1.1 billion peak in 1981 (Hogan, 2014); only a handful of the fifty US vinyl pressing plants that existed in 1978 were still operational.

In the meantime, most record labels had outsourced their physical production, whilst independent pressing plants shifted to manufacturing CDs. Many professional mastering studios subsequently focused on preparing sound recordings for digital media. With respect to certain specialized components of vinyl record manufacturing, all firms halted their production. For example, the last remaining vinyl record pressing machine manufacturer (the Sweden-based Toolex Alpha Ab) ceased production in 1990 (Fremer, 2016).

Entry of Amateur Enthusiasts

The 99 percent drop in vinyl record sales and the overall aforementioned firm exodus suggest that vinyl record manufacturing was quasi-extinct at the start of the twenty-first century. However, a closer examination of developments in the 1990s and 2000s reveals a more complex story. For instance, more than two dozen (relatively small) vinyl pressing plants around the world began operating during this period. Additionally, new disc-cutting accessories were developed, and new disc cutters (“vinyl mastering engineers”) and disc-cutting repair technicians appeared. These developments are attributable to amateur enthusiasts’ involvement in vinyl record manufacturing. Notably, despite disruption and very limited opportunities to profit financially, individuals around the world continued to be interested, or developed an interest, in the process of making vinyl records.

Data Collection and Analysis

Data collection and analysis proceeded iteratively, with emerging insights being informed by, and informing, interviewee selection, interview protocols, and document searches. Curious about the survival of vinyl record manufacturing across two decades when there were few signs of a viable commercial market, one of the authors

¹All US sales and shipment figures referred to in this article are derived from the Recording Industry Association of America sales database (RIAA, 2018).

of this article initiated informal conversations with record label owners, musicians, recording engineers, and mastering engineers in 2015. During this initial research phase, it became apparent that the majority of the fifty pressing plants active at the time had been established after 1990, and at least twenty before 2010, that is, before any reliable signs of a “vinyl” or “analogue” revival, which had begun attracting media attention in 2014 (e.g., Hogan, 2014; Lee, 2014; Shah, 2014).

The research progressively focused on understanding the challenges the founders and managers of these new pressing plants had faced and how they had addressed them. Aware of supply shortages and recognizing that a few companies classified as “pressing plants” in listings were individuals or small teams cutting individual records (aka “dubplate cutters”), rather than pressing them in a factory, the scope of the research expanded beyond an inquiry focused on vinyl record pressing plants to one that sought to understand how and why enthusiasts had developed skills across all aspects of vinyl record manufacturing.

This resulted in eighty-two semi-structured interviews with individuals across Europe, North and South America, and Oceania between 2016 and 2020, of which twenty-four were combined with site visits (in Austria, Brazil, Canada, the Czech Republic, France, Germany, Switzerland, the United Kingdom, and the United States) to observe first-hand the activities and materials involved in vinyl record manufacturing. Site visits, typically lasting a few hours (though some considerably more), provided opportunities for ethnographic interviews involving questions triggered by specific activities and materials that were present. Of the semi-structured interviews, thirty-four were conducted via telephone, thirty face-to-face, thirteen via video call (Skype or Zoom), and five via email exchanges. In supplementary materials published online, Appendix B provides photographs of several study participants.

Apart from three interviews (conducted by research assistants in Russian, Portuguese, and French), all were conducted in either English or German or a combination of English, Spanish, or French. All but seven interviews were recorded, transcribed, translated into English, and imported to NVivo for analysis. Non-recorded interviews took the form of noted conversational recollection and were also imported.

Interviews used a biographical approach to capture narratives about how and why individuals had become involved in elements of vinyl record manufacturing, the challenges they had experienced, how they had addressed those challenges, and how they had become skilled practitioners. Respondents were also asked about specific developments mentioned by others to gain additional supporting evidence about certain events or provide different perspectives. A list of “key individuals” emerged in these interviews, who (if alive) were contacted and asked to participate. All respondents were offered anonymity.

To prepare for interviews, and as a substitute in case interview requests were declined, articles in newspapers and magazines that mentioned these individuals (or their companies) were collected from the Nexis Uni database and general internet searches. Additionally, books (e.g., Bartmanski & Woodward, 2020; Evans, 2015; Haagsma, 2018; Osborne, 2014), academic journal articles (e.g., Bartmanski &

Woodward, 2015, 2018; Qualen, 1985; Sarpong, Dong, & Appiah, 2016), and trade magazines (e.g., *Analogue Audio Association*), as well as blogs, internet forum entries, and existing audio/video recordings of interviews, were used.

Throughout, the analysis followed abductive reasoning (Mantere & Ketokivi, 2013) as we used theories and concepts as sensitizing devices for our theorization efforts. Given our interest in how and why amateur enthusiasts attempted to resist full digitalization by learning how to make analogue records themselves; why this resistance was challenging; and, prompted by Heidegger and Foucault's writings concerning technology, questioning limit conditions and maturity, we structured our data into several themes.

Sensitive to Heidegger's concerns regarding the "instrumentalizing" essence of technology, we analysed how digitalization shaped the audio production process and product. Though wary of lapsing into analogue idealism, we examined how digitalization occasioned the displacement of human judgment, sensory engagement, and skill and reduced the multiplicity of uses that the sound-carrying device afforded. We then analysed our data to identify why these developments were either embraced or resisted, before coding the methods or actions we identified with regard to supporting and resisting full digitalization. It is here that Foucault's writings on *ascesis* and the exploitation of the partial nature of technological ordering resonated especially strongly with our findings. Finally, we analysed our data with respect to how amateur enthusiasts reflected on their achievements in the wake of media attention and major record companies' renewed interest in analogue media. Here, too, we found Foucault's work illuminating. We grouped the enthusiasts' activities that we identified as contributing to an "art of living" that resisted normalization (Munro, 2014) concerning audio information duplication and storage technology into five types of ascetic micro-practices or micro-disciplinary techniques of self-forming. The thematic coding structure is presented in Table 1.

FINDINGS

In this section, we first present our analysis of the forces that contributed to the submission to organized immaturity through processes of "enframing" (i.e., technological reductionism) and the displacement of human judgment, sensory engagement, and skill in record manufacturing practices as part of the shift from analogue to digital production methods. This is followed by our analysis of the forces that contributed to resistance and the methods that amateur enthusiasts used in this respect to develop maturity. In line with an abductive approach, our analysis goes to and from relevant theoretical concepts.

Forces Contributing to Guardians' Acceptance of Replacing Old with New Technology

Despite rapid advances in digital technology in the early 1980s, record companies initially strongly resisted adopting alternative formats. For instance, a presentation of the benefits of the new digital audio CD at Billboard's 1982 International Music Industry Conference (IMIC) in Greece was met with hostility:

Table 1: Thematic Coding Structure

Descriptive coding	Theme	Aggregate theme
Record companies seek methods of reviving commercial growth amidst financial pressures	Forces contributing to Guardians' acceptance of replacing old with new technology	Submission to enframing and displacement of human judgment, sensory engagement, and skill
Record companies perceive new technology as presenting opportunities to reduce costs and increase profit margins		
Record companies perceive new technology as presenting opportunities to increase revenue		
Reproduction of technology progress narrative	Methods employed by Guardians to inhibit resistance to replacement of old with new technology	
Attempts to limit availability of old technology		
Enthusiasts value creative expression that a physical medium affords	Forces contributing to enthusiasts' resistance to replacement of old with new technology	Resistance to enframing and displacement of human judgment, sensory engagement, and skill
Enthusiasts value interaction with material as part of the production process		
Enthusiasts question dependence on authorities due to engagement with independence movements		
Enthusiasts question reliance on authorities through use of digital communication		
Proactive search for resources	Developing maturity through ascesis: micro-disciplinary techniques of self-forming	
Patient trial and error to develop mastery		
Experimenting and straying afield		
Exposing oneself and one's creations to public scrutiny		
Scepticism and irony		

"Look son, you propose the bullshit!" ... was one of the constructive criticisms that Akira Suzuki, a Japanese Sony executive involved with publicizing the CD, remembered hearing from record-company executives he met in Athens, who had no trouble remaining unimpressed. (Another, which didn't get as lost in translation, was "fuck you.") This year's IMIC conference theme was "The Challenge of Change," but most of the music-biz people ... were not in the mood to be challenged or changed. ... [A Sony representative] later confided that he felt he'd "barely escaped physical violence" (Milner, 2009: 212–14).

However, after only the lapse of a few years, the CD was being embraced by all major record labels. Importantly, music had grown into a multi-billion-dollar industry by the 1970s, with total recording sales in the United States alone rising from less

than \$2 billion in 1972 to more than \$4 billion in 1978 (RIAA, 2018). In real terms, sales subsequently dropped for four consecutive years, putting strong pressure on record companies to quickly find ways of achieving expected, renewed growth. Against this backdrop of substantial commercial growth and subsequent financial pressures, it is not surprising that major record labels viewed recordings primarily or even exclusively as income-generating commodities. According to Mike Papas, who founded and ran an independent vinyl record pressing plant in Australia in the 1980s,

this is a real live example [I witnessed at] a record company: [A manager asked the employees] “what business are we in?” And one of the sales representatives stood up and said, “Selling records and cassettes.” [The manager corrected him:] “No, we are in the business of making money!” So, if they’re using records as a vehicle to make money, when they could be using insurance policies as a vehicle to make money, then this will be their mentality (interview).

From a Heideggerian perspective, the example embodies the organized patterns of commodification in which one thing (music) becomes another (traded recording), then another (money). The focus on sales figures and financial profitability that came with rapid commercial growth and subsequent market decline in the record industry arguably accelerated this “enframing,” creating openings for digitalization to further deepen and expand this transformation of distinct things (music, artist, recording) into a common state (means for generating income) (Kopytoff, 1986: 83).

Digital technology arrived in the audio domain after the oil crises of the 1970s, which had already triggered noticeable cost reduction methods by record companies (Hacohen, 2018). Whilst relatively expensive to set up, a CD manufacturing plant promised reduced material, labour, and distribution costs, compared to less automatically produced, larger and heavier vinyl records. Processes that previously relied on a certain level of human judgment, manual skill, and dexterity could now be performed by machines. A large record label could have a CD manufactured for less than seventy-five cents and sell it for more than ten dollars to record stores (Strauss, 1995). Continuing to manufacture vinyl records, which offered a much lower profit margin, did not make financial sense, which, as noted earlier, is the primary sense that appeared to matter to major record company executives.

In addition to promising lower costs, digitalization raised expectations of increasing revenue. By switching to a new format, record companies could reissue, and thereby resell, existing material. This reformatting meant that large expenses and risks associated with signing new artists and promoting new releases could be avoided (Levitch, 1989). For this increased revenue to materialize, consumers needed to be persuaded to buy old recordings in the new format. Persuasion, in turn, depended on the discontinuation of old formats.

In summary, with pressure growing for record companies to view records primarily as commodities, and the new CD format raising expectations of both financial growth and profitability, a shift from analogue to digital production methods involving greater automation was eventually supported by all major record companies.

Methods Guardians Employed to Inhibit Resistance to Replacement of Old with New Technology

As mentioned, major record companies had an interest in effecting a rapid and complete technological transition. They did so discursively—by reproducing the progress narrative that portrayed analogue recording as obsolete—as well as by continuing to control access to material that could allow others to manufacture vinyl records and thus subvert the progress narrative.

Specifically, marketing campaigns in the early 1980s proclaimed that “vinyl LP records are dead” (Cox, 2015), with Philips’s technical director announcing, “From now on, the conventional record player is obsolete” (Hunter-Tilney, 2018). The rapid commercial success of the CD appeared to support this argument of unqualified superiority. Consequently, individuals who wanted to become involved in vinyl record manufacturing, whether by applying for jobs at independent pressing factories, starting their own factories, or purchasing vinyl record manufacturing equipment, were dissuaded from doing so. For instance, when enthusiasts requested information and material related to vinyl record manufacturing from pressing plant managers and mastering engineers, they often encountered a dismissive attitude:

When I would call these pressing plants with my young enthusiasm, that would generally only take me to the secretary ... and if you got lucky, you’d be able to talk to the boss, who’d say, “Erm ... vinyl? Forget it” (Flo Kaufmann, interview).

This attitude extended to parents concerned about their children’s career prospects. For instance, the manager of a UK pressing plant founded in 2001 noted,

When I was trying to take on ... apprentices, I was getting the kids at the interview quite excited once they’d seen the factory and what we did and whatnot ... and [after] going home and explaining to their parents [what they were going to be doing] their parents [would say], “Whoa, that’s not a job; there’s no career in making records,” and then the kids were ... not accepting apprenticeships (Adam Teskey, interview).

Unlike entrepreneurs, who are recognized as engaging in a risky endeavour but are often praised for their autonomy and courage, individuals who consider investing time and/or money in a supposedly inferior technology face being told they are misguided, unproductive, and backwards. The technology, already revealed itself in its singular digital form, was apparently irresistible: one would be backward not to acknowledge this.

Several enthusiasts also disclosed that attempts to limit involvement in vinyl record manufacturing went beyond discourse. For instance, in a perversely Luddite move, factories run by major record labels decided to destroy their equipment rather than sell it to interested buyers. According to Mike Papas, one factory manager told him that he “would rather put a sledgehammer through the moulds [used for pressing vinyl records] than give them to you for \$100” (interview). Similarly, Thomas Bernich noted,

Dave Miller [son of the founder of the pressing plant Hub-Servall Record Mfg Corp.] went to dismantle a pressing plant, and they’d actually cut the presses in half. ... I heard [they did that] because if you committed to being a replicator, and you’re going to do the new

medium, which was CD, you would show your good faith [by destroying], or you had to destroy, your presses to acquire the CD equipment (interview).

The few remaining suppliers of parts and repair services for vinyl record production also restricted access to tools and knowledge. Benefitting from their monopoly positions in shrinking commercial markets, they had few incentives to train apprentices or share their knowledge and material with others (Grassegger, 2016; Koeber, 2015).

The aforementioned themes reveal that the pressures to subject to the ordering of a singular mode of technological revealing were felt intensely. Guardian figures abounded. In addition came the closing down of alternatives, stemming from a combination of purposeful direction and the expression of internalized beliefs about technology and commercial viability.

Forces Contributing to Enthusiasts' Resistance to Replacement of Old with New Technology

Why did several individuals and groups of friends around the world resist this seemingly one-directional shift from analogue to full digitalization by trying to make vinyl records themselves, despite a dwindling commercial market? Our analysis reveals four salient factors: immersion in artistic fields valuing creative expression, inspiration from independence movements in the industry, yearning for handwork, and the democratizing potential of digital communication.

First, many of the amateur enthusiast vinyl record makers were artists or involved in art from an early age. For instance, Martin Sukale in Germany had been a successful actor as a child; Flo Kaufmann in Switzerland had been a DJ and composer, using self-made synthesizers; and Thomas Bernich in the United States had attended art school in New York. What motivated them to set up pressing plants and learn the craft of making vinyl records was not an escape from digitalization and a return to earlier, idyllic analogue eras—nor even an attempt to achieve the highest fidelity possible (i.e., they did not see themselves as elite, “audiophile” experts); rather, it was a yearning for creative expression they felt vinyl recording could support.

Notably, the vinyl record—ostensibly created with the single purpose of carrying sound—accumulated several identities or uses after it was developed. It became an art object, a musical instrument (in conjunction with a turntable) (Faulkner & Runde, 2009), a commodity to be bought and sold, a marker of personal identity for its owners, an object whose material properties “humanize” sound through sonic warmth, and a medium for the long-term conservation of sound, to name a few (Bartmanski & Woodward, 2015). The CD, because of its much smaller size, visual disappearance during playback, sterile sound, and specific chemical composition (which arguably does not guarantee the same longevity as a properly stored vinyl record), limits some of these uses. The reduction of a recording to a bit string that can be stored on virtually any digital device goes further still by effectively eliminating most of them (arguably including long-term conservation²). By increasing

²There is a movement by archivists to revert back to physical models instead of relying on digital material due to the inability to predict how long certain file formats will be supported in the future (Eagan, 2012).

efficiency and convenience, full digitalization not only reduces human judgment, sensory engagement, and skill involved in certain parts of the manufacturing, recording, and listening process; it also, as a natural consequence of these aims—unless contrary efforts are made and become successful—strips back what is superfluous to the commercial creation and distribution of sound. As per Heidegger, this reduction of an object to a singular function is the essential characteristic of technology—the totalizing order of industrialization. The process is everything, and the acknowledgement of individuals as subjects with creative power is suppressed: musicians are subjectified to commercially successful styles, and those who recorded, mixed, and mastered the sound become units in the bit stream, barely acknowledged (Glossop, 2014).

In contrast to this reductionist view of a recording, enthusiasts emphasized that for them, “*the medium is the message*” (Thomas Bernich, interview); yet here, rather than the mediating technology assuming organizational dominance, it was, in line with Foucault’s more sanguine recognition of being freer than we feel, a spur to creative expression, which is a fundamental characteristic of art practice (Reckwitz, 2017). For these creative enthusiasts, making vinyl records was a form of exploration and experimentation.

Second, many of these enthusiasts had been involved in the independent music scene instead of being affiliated with any of the major record companies. For instance, Chris King, co-founder of the Independent Record pressing plant in the United Kingdom, was a musician with a hit single released by an independent record label; Ton Vermeulen, founder of the Record Industry pressing plant in the Netherlands, had been a DJ at a pirate radio station; and Michael Haentjes, founder of the Optimal vinyl record pressing factory in Germany, owned an independent record label and publishing company. The independent music scene promoted a “do-it-yourself” ethos that was an irritant to the major record labels and perhaps, by that fact, commercially viable. In particular, the success of independent record labels in the 1980s and 1990s—such as the ability to sell records without relying on major record companies’ distribution channels (Gray, 2011; Wray, 2018)—signalled that alternatives to the mainstream were possible. For instance, when asked whether he ever approached existing vinyl record pressing factories for information or spare parts, Martin Sukale responded,

No, we never did that. We only did that in this underground scene, this independent record pressing scene. ... The big established companies were the class enemy, so to speak, in this funny music scene that existed. It’s also punk rock, or this whole rebellious stuff. ... So, we said, “Ah yes, we have to have our own record presses and set up our own record labels.” ... You always felt a sense of satisfaction when you were able to do it yourself (interview).

In other words, when the Guardians (i.e., major record labels) proclaimed that the future was digital and analogue was dead, members of the independent music scene refused to accede. Already used to operating at the edge of what was considered normal, appropriate, and valuable, they harboured an inherent mistrust towards limits Guardians set for them and took inspiration from others who had also organized along limit conditions of the industry.

Third, an interest in making vinyl records cannot be viewed independently of a general “maker” movement that, in the case of amateurs tinkering with electronics, can be traced back to the post–World War II period, when technology developed for military uses became available to the general public (Croidieu & Kim, 2018; Pinch & Trocco, 2004; Schiavone & De Falco, 2016). A fascination with tinkering and making has spawned popular literature on craft—ranging from woodwork (Korn, 2017) to motorcycle repair (Crawford, 2010) and the reassembly of household items (May, 2017)—as representing a meaningful and therapeutic endeavour. Unlike CD manufacturing, which was fully automated and did not permit manual intervention, transferring a signal to a master disc, electroplating, and pressing records, as well as adjusting and repairing analogue equipment, typically required, or at least allowed, involvement. It is this ability to directly interact with and become skilled in responding to and shaping material that attracted enthusiasts to elements of vinyl record manufacturing. In Heidegger’s terms, it allowed them to develop a more open and intimate relationship with their environment in which a product could be “brought forth” (*Hervorbringen*), not one in which an audio signal could be forced to submit to any demands (*Herausfordern*)—as is the case in digital, where electromagnetic waves can be deformed into unnatural “square waves” (Ulrich Sourisseau, featured in Moon, 2012)—requiring instead attentiveness, discipline, and skill.

Hence, when asked in an interview for this study whether mastering for vinyl was more of a science or an art, Mex Wieshofer, founder of a mastering studio in Austria, was adamant that it was a craft (“ein Handwerk”) that demanded literally learning how to “handle” material, involving “always having your hand on it.” Indeed, several amateur enthusiasts who set up their own mastering lathes (e.g., Jesus Agnew in Greece, Arthur Joly in Brazil, James Sillitoe in Australia) or pressing plants (e.g., Andy Bauer in Germany, Thomas Bernich in the United States, Chris King in the United Kingdom) had showed an interest in assembling, dismantling, reassembling, and fixing equipment themselves—in some cases both within and outside of the audio domain—before becoming involved in vinyl record manufacturing.

Finally, the increased availability and use of digital forms of communication also contributed to questioning dependence on traditional authorities, such as corporations, for information and other resources. Via forums, individuals could reach out to and interact with one another to share information and resources that had previously been restricted. As noted by Chris Moss, who worked at and set up several pressing plants,

one needs to keep in mind that record manufacturers in the past kept their secrets and shops as well as their processes shut to outsiders. Being here in this forum with the free exchange of ideas, one gets the feeling it was always like that; of course, this was not the case.³

This development is not unique to vinyl record manufacturing and could also be viewed as part of a wider, digitally enabled maker movement that promotes equity

³ <https://www.lathetrolls.com/viewtopic.php?f=1&t=1198>.

and inclusiveness to support the creation, re-creation, and alteration of devices (Anderson, 2013; Browder, Aldrich, & Bradley, 2019). Hence digitalization simultaneously closed off (by automating and “black-boxing” certain processes) and created openings for democratic participation (by connecting individuals around the world with another).

In summary, for individuals steeped in artistic values and the independent scene who had developed an interest in “tinkering” or “making” and had become used to freely accessing and sharing information, major record companies’ decision to support one particular technology and dismiss all others triggered some resistance. Motivated by efforts to creatively express themselves, make things with their own hands, and stay true to the “DIY spirit,” and inspired by efforts of a public of others who were increasingly communicating via the internet, this resistance manifested in attempts to test limits and make vinyl records themselves. But this resistance also had to overcome the force of machination to realize a swift and universal transition towards full digitalization.

Developing Maturity through Ascesis

How did amateur enthusiasts overcome the challenges mentioned earlier to resist progressive enframing that, if the calculative forms of reasoning practiced by Guardians had their way, would eliminate apparently useless technologies? We identified several forms of *ascesis*, namely proactively searching for resources, engaging in patient trial and error to develop mastery, experimenting and straying afield, and exposing oneself and one’s creations to public scrutiny. We discuss each of these in what follows.

Proactively Searching for Resources

First, we found that, unless they already had family connections to the industry, individuals interested in making vinyl records spent a lot of time and effort searching for relevant material, such as disc-cutting lathes, pressing machines, or information about the manufacturing process. Enthusiasts used a range of methods, including scanning classifieds for used items, reading scientific articles about disc cutting in public libraries, contacting mastering studios and remaining pressing plants, and—quite unusually for individuals who had no experience running factories themselves—participating in auctions for pressing machines and other items when pressing plants had become insolvent. By engaging in such research, enthusiasts demonstrated a critical attitude to the mainstream narrative that vinyl record manufacturing was obsolete because it had been replaced by digital technology.

For instance, despite being told to “forget” about vinyl, Flo Kaufmann compiled a list of all mastering studios in the region and contacted them, acquiring some spare parts that mastering engineers who had switched to digital mastering no longer used. Eventually, he obtained an incomplete professional disc-cutting lathe from the only remaining disc-cutting service technician in Continental Europe, but only after supporting his repair work on an unpaid basis (Grassegger, 2016). Like Kaufmann, other enthusiasts regularly searched for vintage items at fairs, in ad papers, and, later, on eBay. Lukas Obwaller, an engineering student in Vienna, Austria, confessed

that he spent much of his spare time and money on acquiring legacy technology elements—not for the sake merely of collecting them but with the intention of using them to make records:

I always wanted to do it myself and then, when I was 14, ... I started to buy some parts with my minimal budget. ... You buy a cutting head from a device from the '50s and ... some amplifiers ... but you have to first do some research: who has built devices like this; what is the name of the device; what am I looking for? (interview).

Other enthusiasts around the world were doing the same, including Peter King in New Zealand, who had started collecting legacy technology elements in the late 1980s, demonstrating the stubborn curiosity and discipline characteristic of *ascesis*:

There was a lot of research in the early days. I went to many libraries and got stuff from all around the world and checked out what could be done to achieve something as a standard, if you like, in the lathe cutting field. ... I nearly went out of my mind trying to check out all the different systems because, of course, these machines were changed over the years and there were many different types of cutterheads and many different types of amplification, many different types of lathes. I had to actually check and see what everybody was doing and then develop a method for building something sophisticated (interview).

Patient Trial and Error to Develop Mastery

In addition to acquiring legacy technology elements, amateur enthusiasts needed to develop the ability to use them—generally without being able to learn via traditional methods, such as apprenticeships or detailed guides, thereby providing a looseness that was potentially absent in the past. When asked how they learned to use old and partly damaged equipment, they consistently mentioned the importance of developing patience and committing to the demands of trial and error. In the case of vinyl record manufacturing shortly after the commercial success of digital formats, this was especially the case given that new practitioners had to rely on auto-didactic methods. Almost all interviewees noted that being able to cut a good-quality disc or pressing a record requires time, determination, and perseverance. For instance, Mex Wieshofer noted in an interview that even cutting a silent groove is a challenge at first—a point confirmed by mastering engineer and pressing plant owner Aidan Foley in Ireland:

It took years. Starting with the first dub plate I cut, you could barely hear the audio over the background surface noise. It was just appalling. It's constantly just trying to work at it. ... Just getting a dub plate to come out something half decent. And then developing that, developing that, and just keeping at it (interview).

Owing to its relatively unprotected exposure to the environment and limited automation—unlike CD production, which occurs in a protected atmosphere with set parameters—vinyl record manufacturing depends on carefully aligning all parts to suit environmental conditions in a particular setting. Instead of a single process of setting up a pressing operation, there was room for creativity and ingenuity in terms

of utilizing, or bringing forth, rather than suppressing, the affordances of the natural environment. Hence the patient trial and error required to develop expertise involved the exploration of possibilities and adaptation. For example, Frank Kirschner, who cofounded a pressing plant in Germany with equipment he sourced from Bolivia, noted,

We had to adapt. ... For instance, the cooling technology was ingenious in Bolivia. The pressing plant was in La Paz at almost four thousand meters above sea level and ... the inner courtyard had a drain and there were these lawn sprinklers at gutter level, and the cooling water that was too warm was pumped into the courtyard accordingly, that is, it started raining and as it was pouring down, it cooled down. ... And then it flowed back into the pressing room via a floor drain, where it was used again as cooling water. Of course, it is impossible to do it like that here in Germany. We had to approach it differently and work with other technologies to set up a new system (interview).

Similarly, Rob Brown (co-founder of Viryl Technologies, a company that began manufacturing new pressing machines in 2015) noted how certain factories used custom setups, such as utilizing a nearby river for cooling.

As part of the disciplined experimentation necessary to make records, amateur enthusiasts had to develop a feel for what was possible, what was not possible, and what was risky, given the limitations with which they were dealing. For instance, given DJs' preferences for loud cuts, this often involved walking a fine line during the mastering process between making a record as loud as possible and making it unplayable or overheating the cutterhead.

Experimenting and Straying Afield

Given new vinyl mastering engineers' limited embeddedness in the industry and their openness to experimentation, they did not necessarily adhere to certain conventions when engaging in trial and error. Whilst some members of the older generation of mastering engineers frowned upon such transgressions, others regarded this as a legitimate expression of creativity and progress:

It's a bit like saying, "Oh, Jimi Hendrix is turning his guitar up too loud; he doesn't know what he's doing; his guitar is distorting," and it was the same thing with this. These guys were doing like drum and bass. ... If the old guard, like me, we would be peaking to zero there, these drum and bass guys were just slamming it. ... And these were a different bunch of people. They were pushing boundaries (Graeme Durham, interview).

Though transgression was attributed to a younger generation, it was also accepted, indeed with some irony, that the makers in this setting were nearly all male, consciously and reluctantly so. Rumours of female makers sent them scurrying for more information, curious to witness the occasional incursion. They rather lamented this, a limit they could seemingly do little to transgress and one that conforms to how craftwork can work along gendered lines (Bell & Vachhani, 2020; Holmes, 2015; Ocejo, 2017).

Additionally, with respect to creatively adapting to the environment to make vinyl records, amateur enthusiasts were willing to employ digital technology. This meant

using digital communication platforms to share and collect information; computer-assisted drawing (CAD) software to design parts; and digital controls and sensors to support existing, and develop new, processes. Instead of adopting a dogmatic or nostalgic approach in which purity had to be maintained and digital technology was shunned, many of these enthusiasts attempted to make use of the potential of all available technologies. Describing themselves as “*digital natives*” (Martin Sukale, interview) and “*bricoleurs*” (Flo Kaufmann⁴), these individuals used digital design tools, developed digital controls, occasionally worked with digital source material, and presented some of their results in digital formats via the internet. Rather than viewing analogue as inherently superior to digital, they recognized that each was more or less useful for different purposes and that, played out together, interesting but ungoverned events could occur.

The enthusiasts balked, however, when they felt that algorithms supplanted judgment. For instance, the largest pressing plant in the world, founded in Czechoslovakia shortly after World War II, and one of fewer than a handful of factories in Europe that never completely stopped making vinyl records, allegedly introduced algorithms to automatically shape a signal for vinyl mastering (GZ Vinyl, 2017b). For Flo Kaufmann and others, such mechanization was akin to “*buying bread at a supermarket instead of a bakery*” (interview), rendering the making process and resulting objects devoid of life—despite the company claiming “We make vinyl records with love and care” on its website (GZ Vinyl, 2017a).

Exposing Oneself and One’s Creations to Public Scrutiny

Finally, as Clarke and Holt (2010: 70) argued, exposing one’s thinking, acting, and feeling to public scrutiny through performative demonstration is “a potentially mature act.” The maturity comes in a willingness not only to struggle with thinking in enlarged, consistent, and unprejudiced ways but, following Foucault and Heidegger, to do so with a sense of generosity (sharing) and experimental openness. The makers “became” public in two distinct ways: by publishing their working practice and by trading.

Specifically, a community of enthusiasts emerged that also shared their efforts to build and restore devices in a dedicated forum, self-ironically titled “Secret Society of Lathe Trolls.” These efforts were also communicated by uploading and live-streaming videos via social media. Additionally, several members of this community established mastering studios and pressing plants that provided vinyl record manufacturing services to the public. A few enthusiasts also offered repair and restoration services and/or sold parts they had developed. As such, they established a common space for themselves as makers, sharing and supporting one another in the use of often costly and rare technology and, as Browder et al. (2019) also find, accepting that, even though they did not share common physical space, this openness was a necessary condition of belonging to the community.

⁴https://soundcloud.com/flo_kaufmann.

Exposing their ideas and designs to the public constituted a big step for some because it resulted in scrutiny from the growing community of enthusiast vinyl record manufacturers—scrutiny that could involve critique as much as praise. Individuals who announced that they had developed a new part or device were regularly told to prove their claims, as James Sillitoe (who developed a new disc-cutting lathe) noted when reflecting on his own experiences:

There's a couple of little comments that he [Flo Kaufmann] has made because I'll post 3-D renderings of my designs before I post the real thing. So, one comment, which I'm sure was directed at me, was like, you know, "It's not just 3-D fantasies" with him (interview).

In submitting their work to public comment, enthusiasts exposed themselves to judgment, itself a form of risk, giving further impetus to questioning and improvement.

In summary, enthusiasts who had decided to rediscover an old technology instead of simply accepting its substitution developed a form of mastery that they were able to demonstrate publicly. These individuals developed a deep understanding of and appreciation for the limits and openings of technology. They became craftworkers, thereby also developing a relationship with technology conducive to realizing its natural potential (Heidegger's *Hervorbringen*), and exposed their disciplinary skill as a style available to the scrutiny of others by spreading ideas, sharing tools, and trading products in proto-markets, often assisted by the use of online digital platform technology, revealing an intimacy rather than antagonism between craft and technological mediation (Fitzmaurice et al., 2020). Their struggle towards maturity lay in experimenting with the potential of all technologies to creatively express themselves (rather than restricting themselves to any particular technology) and in overcoming hurdles set by Guardians by engaging in micro-disciplinary techniques of self-forming: they read, they listened, they practiced, they tested, then they did it all again, and their passion for knowledge was, at least for those prepared to go public, and ironically relate to themselves as the "old guard," more than an acquisition of knowledgeableness; it touched on a straying afield.

The Limits of Maturity

Finally come scepticism and irony. Though compelled and uplifted by their experience, the vinyl record makers remained equivocal about their achievements and status. When asked if they would do it all again, several said not, highlighting the struggle and difficulties of keeping the limit conditions in view, of trying to find ways through them or having to reluctantly accept them. Additionally, the fact that vinyl records had subsequently gained media attention and become acceptable, indeed, desirable, had left many slightly bewildered. For some, the craft itself was being enframed, absorbed, by the Guardians.

Overwhelmed by the sudden increase in demand, several small pressing plants run by enthusiasts (at least temporarily) stopped accepting orders beyond their circle of friends and acquaintances—or even stopped making records altogether. Martin Sukale, by now recognized as a leading figure in the amateur enthusiast vinyl record

making community, publicly announced that he would dump his pressing machines into the nearest river to protest against the greed that was crowding out craftworkers (Koeber, 2015). Similarly, “record store day,” which was started in 2007 to “celebrate the culture of the independently owned record store,” triggered a backlash as major record labels began using it as a marketing opportunity:

Cashing-in is what the record business is. We’re not upset with major labels for being major labels. What I’m not crazy about are the literally hundreds of pieces of shit being shoved into the marketplace on this day; products, for the most part, that no human needs to own, ever. The economy of Record Store Day is, “What can we shit into the form of a record and shove into the hands of the wanton masses?” (Rob Sevier, cited in Hebblethwaite, 2014).

Now that the legacy technology was once again regarded as a complementary force in merchandising music, the makers found themselves having to face the task of self-making again: the craft of analogue media production was a questionable path, which is what makes its maturity; recalling Foucault, it is not a newly contained state of affairs (an accomplished self) but an awareness of the inevitability of subjectification and the continual task of ironically testing its Guardian-like claims to authority.

DISCUSSION

Our analysis was motivated by the question of whether and how in craftwork we may find sufficient awareness of limit conditions to foster maturity both despite and because of the rapid spread of digitized mediation. Throughout, we have noted how, in the passage from being an amateur enthusiast to becoming a skilled maker—a craftworker—there was a preparedness to investigate “the events that have led us to constitute ourselves, and to recognize ourselves as subjects of what we are doing” (Foucault, 1984b: 46). There are, broadly speaking, two related bodies of work to which we have contributed, first, studies of craftwork and, second, studies of relations between organization, ethics, and technology.

Craftwork

Craft has its own fixing, Guardian tendency: there is an emphasis on preserving tradition, enlisting standards and criteria as limit conditions that define what it is to reach a state of mastery, notably when enforced through generational traditions (Sasaki et al., 2019). What we find among amateurs is a self-taught, collective, and inherently speculative development of knowledge which can amount to a threshold state and so, ipso facto, tip into immaturity, if by maturity we mean a process of becoming, not a state of being. There was an admission among the makers of a slightly cabalistic feel to the community, and certainly some related to the knowledge of mastering as though it were an arcanum into which one was granted access. Yet the guardianship was often exercised openly and without force, and the sharing of information and techniques was made as much in an atmosphere of inquiry as instruction and initiation.

Writers on and exponents of craft can wallow in a form of melancholy, somewhat nostalgic for the restoration of lost ways, what Suddaby et al. (2017) call historic re-enchantment. Tellingly, we found little of this “loss.” Indeed, it was in service to the experimental continuation of techniques that amateurs began to dedicate themselves, thereby transforming a practice that had hitherto been ravelled up with a commercial logic of maximizing exchange value into one with different limit conditions. What was once peripheral to the practice became central: the delight and difficulty in reading and making grooves, the tactility, the sense of auditory warmth—all these material properties cohered in the making as things of significance. What was once a mechanical work practice performed by technicians became a craft practice. In part, this could be seen as an example of how craft humanizes work practices (Bell et al., 2018; Kroezen et al., 2021; Suddaby et al., 2017), by refusing a dominant form of subjectification.

We observed in two ways the straying afield of the human subject that we ascribe to maturity. First, under the aegis of craftwork, the locus of the human is set amidst a democracy of things and takes on what Bell and Vachhani (2020) conceptualize as an affective atmosphere. Yet this affectivity is not a loosening of the subject. The makers open up to things in ways that factually strengthen a sense of self. To recur to Foucault’s *ascesis*, for some of these makers, their passion for knowledge and stubborn curiosity extended to a willingness to stray afield from their knowledgeability. This loosening, rather than lessening the presence of the human subject into a being that is more humble, passive, and adaptive to wider environmental forces, actually accentuates it. Those makers in our study who went public, who tested themselves openly, were very much alongside, rather than distinct from and in full control of, the machinery, the raw material, the sound, the form. Yet what stirred them was attaining and sustaining this experience of “being alongside,” of rubbing up against limit conditions—in this case, those set in play by technical knowledge, by the availability of materials, by distribution channels and markets, by collective communications. Any transgression of these limits was haphazard, unplanned, but tolerated, even encouraged, as it yielded a distinctiveness to the character (ethos) of being a maker that otherwise would be more a case of “falling in” with prevailing forces of knowledge and power. Here the micro-practices of *ascesis* are also ones producing power: there is an accepting of technology without this inevitably becoming technological; maturity is the continual negotiation of this distinction laid down by Heidegger. In its curiosity and caution, its slowness, its pausing, it disturbs the headlong rush into the productivity and permissiveness (which we might associate with the urge to continually innovate, the neophilia) that enframe (or envelop) life.

Second, no matter how technically adept, how well regarded, and how successful in realizing engaging and enriching outcomes, the makers typically remained sceptical and, in some cases, ironic. The work induced a sense of self-awareness that was perpetually critical. They sensed that, whatever their expertise amounted to, it was never enough and, for some, not necessarily worth the effort, recalling *ascesis* and specifically Baudelaire’s self-questioning: just what is it about skill and refinement that matters? In being coupled to scepticism and irony, the force of maturity comes in a restlessness that belies what is often said of craft, for example, by Sennett (2009),

that it is a combining of head and hand in the service of doing a job well for its own sake, courting complexity and ambiguity to realize an even greater sense of mastery. Our study suggests that the experience is far more haphazard and less centred on the elevation of an “expert” maker. To recur to Foucault’s advocacy of *ascesis*, the makers’ curiosity was, at times, of a form that took them away from themselves, rather than confirming their knowledgeability. Self-forming was as evident in displacement as it was in their settling into the skilled craft practice being demanded by this resurrected technology. The complexity and ambiguity of their situation arose when their knowledgeability was questioned, not in terms of their skill level, but for its social and cultural resonance. This questioning was often felt as exasperating, and even resented, but nevertheless, it provoked them to consider how acquiring skill, somewhat perversely, constitutes a neglect as much as an enhancement of self-formation.

As noted, our case of vinyl record makers is part of a wider craft or “maker” movement whose members regularly combine relatively old and new technologies (Anderson, 2013; Browder et al., 2019). Via the use of new technologies, certain production practices that were previously guarded—in terms of restricting both by whom and how they could be performed—have become increasingly accessible to such makers and, owing to their limited financial viability or scalability, untethered from commercial imperatives. Hence, by making certain production practices obsolete, the new technology provides opportunities for them to be re-evaluated (Maines, 2009). Our analysis suggests that technological progress contributes both to organized immaturity and to maturity: whilst displacing judgment and skill, it also, in juxtaposing new and old, raises questions about the effects of such displacement. We would therefore expect to find similar developments in other settings that have experienced technological disruption and given rise to what could be labelled the renaissance of craftwork (e.g., Ocejo, 2017; Suddaby et al., 2017), including mechanical watchmaking (and repair), bookbinding, and so on.

Our article thereby also contributes to the ongoing discussion about how craft can or should be conceptualized in management studies. As Kroezen et al. (2021) have shown, competing definitions of craft exist, each highlighting particular work skills (mastery of technique, all-roundedness, embodied expertise) and/or attitudes (devotion to one’s work, concern with communal interests, exploratory mindset). Nevertheless, Kroezen et al. argue that craft should be conceptualized “as a timeless approach to work that prioritizes human engagement over machine control” (502).

By drawing from Heidegger and Foucault, and examining this prioritization of human engagement, in our case, we question the elevation or isolation of the human implied by such a prioritization. We find craft associated with a critical attitude—one that involves resistance against pressures to conform to *both* new technological understandings *and* traditions (rather than favouring one over the other), entailing personal sacrifices with uncertain gains. Hence craft is more than a commitment to exploration and developing particular work skills. It extends to self-forming, which we understand as a questioning and self-disciplining process of resisting immaturity and developing maturity. If we continue to apprehend craft as a practice in which the human severs from the technological (Kroezen et al., 2021), we find this in an

equivocal, even upsetting relation to skill, rather than in its uncritical elevation. It is in its willingness to break the expert receptivity and so disturb its achievements, and to question itself (as when the moniker “craft” is resisted), that craft makes room for critique.

Organization, Ethics, and Technology

The study follows subjects for whom subjectification to systems of power and knowledge is endemic, and what makes them distinct is that through craftwork, the mediating force of technology is revealed. In this revealing, technology becomes questionable: limit conditions are brought into view, and so is the possibility of their transgression. As Allen (2003), Raffnsøe et al. (2019), and Weiskopf and Munro (2012) all testify, for Foucault, this reaching and transgressing of limit conditions is a practical activity embedded in heteronomous conditions; there is no reaching into an ahistorical state. It is, as Dey and Steyaert (2016) remind us in their study of social entrepreneurs, a tactical practice of accepting, absorbing, and twisting away from inevitable calls of power and knowledge, in which self-care comes forth. Maturity is less an innate, inner individual characteristic than an *ethos* consequent upon, first, the situational development of micro-disciplines that resist the instrumental encroachment of global, industrial technology and, second, the inevitable failure of that technology to constitute a totalizing condition.

First, the micro-disciplines came in the form of obsessive self-instruction in the ways of machinery, without recourse to established guild or apprentice structures; a feel for the aesthetic and use-value rather than the exchange value of the products (arguing that vinyl produces a sound pitched to the limits of human sensory reach and as such brings itself to human hearing with a sensitivity to which digital technology is necessarily indifferent); a sense of collective endeavour and learning loosely organized with one another in flattened hierarchies that were glued by forms of peer respect; and a willingness to experiment, and so tolerate ambiguity and complexity, despite these being a source of sustained frustration. Here, we suggest, is an embodied co-liability and indebtedness (Heidegger's *Verschulden*) that testify to a revealing of made things that is far more an educating and bringing forth (*Hervorbringen*) than it is a challenging forth (*Herausfordern*). What is made is done so under constant consideration that it ought to be examined and its limits tested by imagining it to be otherwise. Coping with the openness inherent to such technological mediation is, we have argued, mature, in its enaction in a space or gathering in which organizational immaturity struggles to hold sway. Foucault was adamant that forms of self-examination renouncing empirical conditions of community, belonging, and feeling, and which instead associated ethics with an ahistorical, metaphysical, noumenal condition tithed to a will to knowledge, had taken us awry, notably in allowing technology to hold sway as that by which a certain form of knowing—controlling, instrumental calculability—dominates. The call to maturity is not a call to create an alternative outside of the *Gestell*, outside of systems of power and knowledge, but to encounter, make explicit, its contingencies, thereby opening up the possibility of transforming it. This amounts to a style that looks to make oneself the subject of one's own behaviour, a style that both respects and violates reality,

what Rabinow (2020: xxxvi) calls a disentangling and re-forming of relations, and one which, in the field of business ethics, has also been explored by Ladkin (2018) and Munro and Thanem (2018) in relation to leadership. In relation to craft, it is a style dedicated to an expertise that becomes ever susceptible to things being otherwise. This article thereby builds on Alakavuklar and Alamgir's (2018: 31) attempts to open up "an ethico-political space for those who are ignored or suppressed in the ethics and organisations literature," expanding conventional depictions of organizational resistance to practices of entrepreneurial craftworkers.

Second, we have shown how, despite its apparently irresistible progression, digital music production and distribution did not fully coral the industry. Indeed, it was the uncritical and complacent acceptance of emerging technology that provoked a resistance amongst small pockets of users for whom vinyl resonated outside of its being simply means caught in the vast circulation of means and ends that is the entertainment or culture industry (Reckwitz, 2017). As Leclercq-Vandelannoitte (2019) acknowledged, ethical relations within a technological impress are possible. DJs, audiophiles, experimenting technicians, and artists found pockets of technological mediation that digital production could not reach or that it overlooked. From there they were able to twist free from regimes of calculability, albeit only partially. In resurrecting obsolete technology, which was somewhat stubborn and unmanageable, and combining it with new technology, they were setting up new limit conditions and then analysing and questioning these. As such, we argue, they not only resisted immaturity but, through craft, strove towards forms of practical maturity that, by definition, are only ever partial. They were attempting to be the subject of their own attempts at subjection, which, as Foucault acknowledges, is all the mature subject can ever amount to.

In terms of practical implications, our study suggests that questioning dominant discourse about technological progress and disciplining oneself with regard to practically developing alternatives can be unsettling and challenging but also contribute to alternate, more resilient forms of material production. Rather than exploiting opportunities arising from the newest technological possibilities, mature craftworkers can entrepreneurially work amidst the margins and even ruins of an economy by re-evaluating and mastering largely displaced technologies and selectively combining these with newer technologies. It is this development of critical capacities to select—instead of simply accept—technologies that policymakers and educators should seek to encourage if they wish to play their part in supporting maturity.

Supplementary Materials

To view supplementary material for this article, please visit <http://doi.org/10.1017/beq.2022.26>.

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APPENDIX: A BRIEF DESCRIPTION OF THE VINYL RECORD MANUFACTURING PROCESS

Vinyl record manufacturing traditionally comprises several activities that are related to three distinct processes, namely, 1) “disc cutting” or “mastering,” 2) “electroplating” or “galvanics,” and 3) “pressing” or “moulding” (see [Figure A1](#) for a visual representation). Disc cutting involves cutting grooves into the surface of a disc using a stylus attached to a cutter head. The cutter head is mounted on a lathe that moves it during the cutting process and simultaneously spins the disc at the desired speed. The resulting disc can be used as a “master” from which multiple copies can later be generated if the surface of the disc is made of lacquer or copper. To produce multiple copies, the master disc must be electroplated. Electroplating involves coating the disc with silver and placing it in a nickel sulphate bath, where electrochargers fuse the nickel solution onto the silver coated disc. The metal layer, which contains the mirror image or negative of the original disc, is then removed and can either be used to develop more metal copies of the master (that are then used to produce further negatives) or serve directly as a “stamper” (sometimes referred to as a “matrix”). Two stampers (one for each side of the final playable disc) are then placed into moulds and inserted into a hydraulic pressing machine for the pressing process. Via an extruder, materials like polyvinyl chloride (i.e., vinyl) are transformed into a warm “puck” (sometimes referred to as a “patty” or “biscuit”) that is subsequently placed between the stampers. The pressing machine then compresses the puck into a flat disc. During this process, steam and water are transmitted through a labyrinth behind the moulds to heat and cool the vinyl. Finally, excess vinyl is trimmed from the disc, which is then (either manually or automatically) placed into a sleeve.

...

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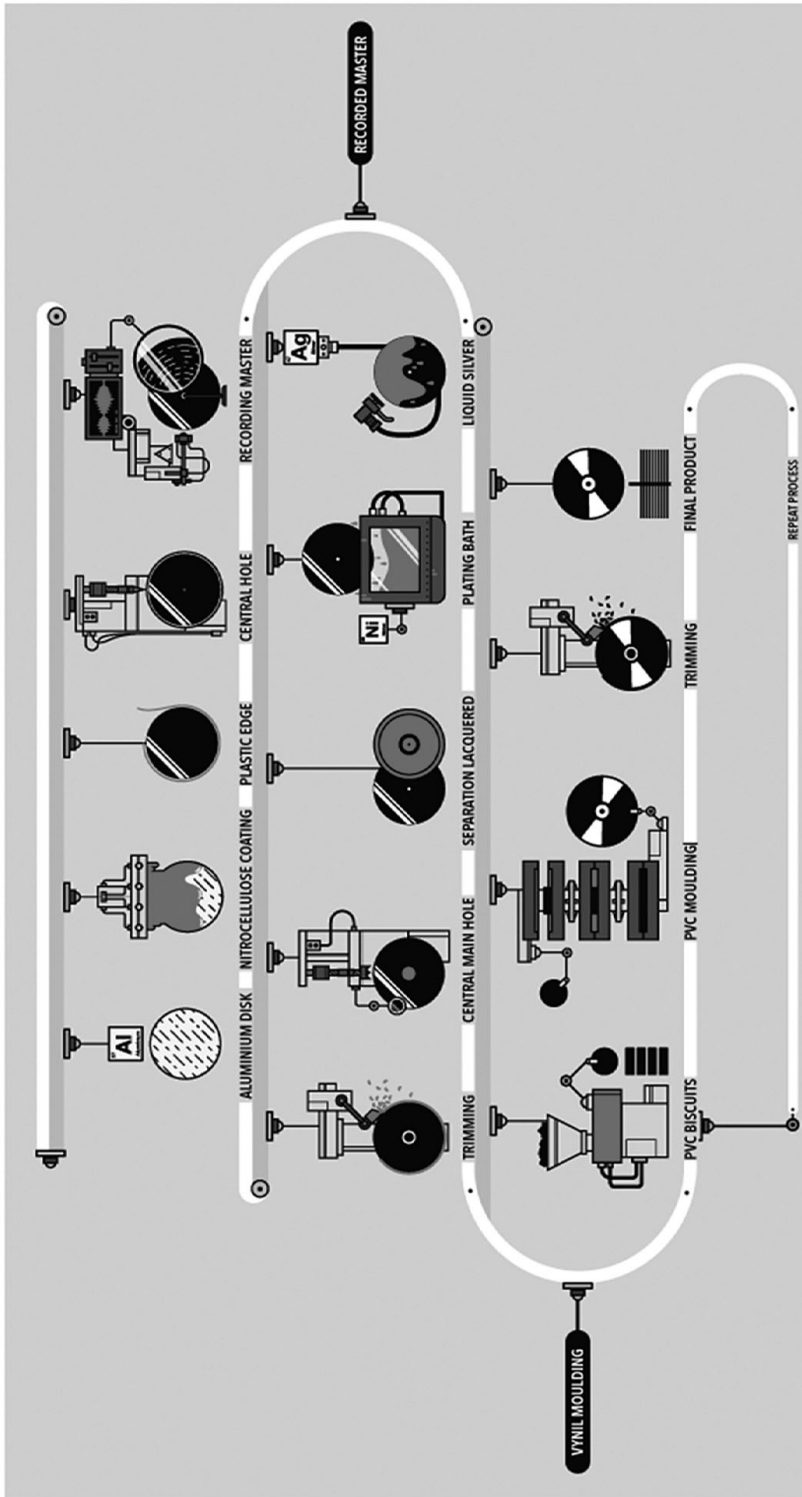


Figure A1: Visualization of the Vinyl Record Manufacturing Process

Note. This image was created during “DensityDesign Integrated Course Final Synthesis Studio” at Politecnico University of Milan, organized by DensityDesign Research Lab in 2015 and annotated by the authors. The image is released under a CC-BY-SA license. Attribution goes to “Marta Mandile, DensityDesign Research Lab.”—Own work, CC BY-SA 4.0, <https://commons.wikimedia.org/w/index.php?curid=37081368>.