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Research article

Deep Technogrammar: A Wittgensteinian Approach Towards a Philosophy of Technology

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Abstract

This paper compares two conceptions of a grammatical analysis of technology (*technogrammar*) based on a Wittgensteinian analysis of language. The first theory, syntactical technogrammar, proposed by Alfred Nordmann by mainly drawing on the *Tractatus*, only concerns syntactical rules of composition. The second one, deep technogrammar, introduced by Mark Coeckelbergh and based on the later work of Wittgenstein, adds to this the dimension of *depth* which describes less transparent transcendent rules which account for the social embeddedness of the meaning of words as well as things. The two approaches are parallelised with two interpretations of what Wittgenstein means by *grammar*, one reducing it to occasion-insensitive surface-level rules and the other one accounting for a new dimension of grammar introduced in the *Philosophical Investigations*. Furthermore, the notion of depth is problematised as it evokes a metaphysical feeling. It is shown that depth grammar needs to be considered as transcendental, but not transcendent as its rules are constituted by concrete social practice. The implicit character of rules concerning depth grammar naturally arises from the problem of rule-following. It is concluded that surface technogrammar fails to properly describe certain aspects of technology due to its rules being occasion-insensitive. Deep technogrammar, therefore, is deemed to be more capable of constituting a philosophy of technology.

Keywords: Philosophy of technology; Wittgenstein; Depth grammar

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Научная статья

Глубокая технограмма: подход Витгенштейна к философии техники

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Аннотация

В статье сравниваются две концепции грамматического анализа техники (технограмматики), основанные на анализе языка Витгенштейна. Первая теория, синтаксическая технограмматика, предложенная Альфредом Нордманном, главным образом опираясь на “Логико-философский трактат”, касается только синтаксических правил композиции. Вторая, глубокая технограмматика, введенная Марком Кекельбергом и основанная на более поздних работах Витгенштейна, добавляет к этому измерение глубины, которое описывает менее прозрачные трансцендентные правила, объясняющие социальную укорененность значения слов, а также вещей. Эти два подхода сопоставляются с двумя интерпретациями того, что Витгенштейн имеет в виду под грамматикой, одна из которых сводит ее к нечувствительным к обстоятельствам правилам поверхностного уровня, а другая объясняет новое измерение грамматики, введенное в “Философских исследованиях”. Кроме того, проблематизируется понятие глубины, поскольку оно вызывает метафизическое чувство. Показано, что глубинную грамматику необходимо рассматривать как трансцендентальную, но не трансцендентную, поскольку ее правила конституируются конкретной социальной практикой. Неявный характер правил, касающихся грамматики глубины, естественно возникает из проблемы следования правилам. Делается вывод, что поверхностная технограмма не может должным образом описать некоторые аспекты технологии из-за того, что ее правила не зависят от обстоятельств. Таким образом, глубинная технограмма считается более подходящей для философии техники.

Ключевые слова: Философия техники; Витгенштейн; Глубинная грамматика

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INTRODUCTION

Employing the Wittgensteinian theory of language to conceptualize technology is not a widely utilized approach. Nonetheless, several authors have written on this topic, most notably Mark Coeckelbergh, whose theory this paper will focus on. What those approaches have in common is that they evoke a notion of grammar in regard to technology. What exactly the authors mean by grammar differs depending on which part of Wittgenstein's philosophy they focus on. Alfred Nordmann (2018, 2020), drawing on the early works of Wittgenstein – primarily the *Tractatus Logico-Philosophicus* (TLP) – introduces a "grammar of things" by claiming that language and technology are merely two sides of the same coin, both based on some sort of underlying grammar understood as syntax. Mark Coeckelbergh (2018, Coeckelbergh & Funk 2018), on the other hand, takes into account the late Wittgenstein's findings in the *Philosophical Investigations* (PI) and while also acknowledging a syntactical grammar of technology, adds to this concept a second grammatical structure, a depth grammar, in the form of games and a form of life. In this paper I seek to analyze how these two different concepts of grammar relate to Wittgenstein's work and explore the consequences the different conceptualisations of technological grammar have when applied to a philosophy of technology.

It is not the object of this paper to discuss whether Wittgenstein should be considered a philosopher of technology (see e.g. Funk 2018) or not (see e.g. Nordmann 2018) and whether the theories discussed in this paper are in line with Wittgenstein's thinking. Instead, an account is developed of how Wittgensteinian thinking can help us think about technology. Therefore, the two aforementioned approaches towards a Wittgensteinian grammar of technology are presented and discussed in relation to Wittgenstein's writings on grammar, mainly the notion of depth. Finally, the two theories are compared in how productively they can provide an understanding of technology.

DEEP TECHNOGRAMMAR: TECHNOLOGY GAMES AND FORM OF LIFE

Mainly drawing on the *Philosophical Investigations*, Coeckelbergh (2018) argues for a "use-oriented, holistic, transcendental, normative, social, and historical understanding of technology" (p. 1505). He proposes that technology can be conceptualized in analogy to how the later Wittgenstein analyzes language, namely that the meaning of a word depends on its use, which "must be seen as embedded in activities and structured by games and a form of life, which contains many games". Technology, then, can also only be understood as technology-in-use, embedded in technology games as well as a broader form of life (Coeckelbergh, 2018, p. 1506). This notion of games and form of life has to be understood in a transcendental sense and can also be described as a grammar:

> They [language games] 'make possible,' structure, and limit a particular use of language and its related meaning. Without these games and forms of life, a particular use of language would be meaningless. Another way of saying this is to use the term 'grammar': a particular use of language is made possible by words

> but also by a grammar that is given, that is already there before a particular use of language. (Coeckelbergh 2018, p. 1507)

Grammar here is used in a broader sense, which Coeckelbergh further explicates by citing PI §664, in which Wittgenstein differentiates between surface grammar and depth grammar:

> In the use of words, one might distinguish 'surface grammar' from 'depth grammar.' What immediately impresses itself upon us about the use of a word is the way it is used in the sentence structure, the part of its use – one might say – that can be taken in by the ear. – And now compare the depth grammar, say of the verb "to mean," with what its surface grammar would lead us to presume. No wonder one finds it difficult to know one's way about. (Wittgenstein, 1953/2009, §664, 176e-177e)

> I propose to interpret this passage as implying that our use of language is not only shaped by a particular surface grammar as syntax, which includes rules concerning how to compose a sentence, but also by a depth grammar in the form of games and a form of life, which constitutes a transcendental condition that must be presupposed in order for the sentence to have meaning. (Coeckelbergh 2017, p. 1508)

The surface and depth grammar of technology can be characterized analogously. Here, the surface grammar also consists of syntactical rules describing how to put things (words) together, with the depth grammar corresponding to games and a form of life. These grammars are transcendental in that they must be presupposed to make the use possible (Coeckelbergh, 2017, p. 1511). Surface and depth grammar as well as the difference between the two dimensions can be illustrated by the example of a navigation device (Coeckelbergh, 2017, p. 1512): There are surface grammars of how the parts of the device are assembled, how the navigation device interacts with a satellite, how it may be installed in the car, including also the built roads the navigation system has to operate on. There is also a depth grammar consisting of games of interacting with a device (voice assisted or via a keyboard), driving and (temporally optimized) wayfinding as well as an overarching form of life, a way of how we do things, commute, travel, and use individually operated vehicles to arrive at certain destinations. In a form of life where time was not as important and instead the most beautiful route (however that would be quantified) would be considered the optimal one, a navigation device would function in a fundamentally different way. In a (from our perspective hardly imaginable) form of life where the only merit ascribed to locomotion would be to be in the outside world, a navigation device would not have any meaning at all.

It follows, then, that artifacts cannot be interpreted as isolated things, but are instead not only bound by a syntactical surface grammar, but also made possible by a depth grammar, which is transcendental and normative in the sense that it is already there and tells us what to do, what surface grammar to follow, and which uses and activities are permissible. To stress the notion of depth, meaning that there is more to a grammar of

technology than just syntax, namely an additional dimension of how we do things, this conception will in the following be referred to as „deep technogrammar."

SYNTACTICAL TECHNOGRAMMAR: LIMITED WHOLES AND WORKING KNOWLEDGE

Another philosopher who employed Wittgensteinian thinking to propose a grammatical theory of technology is Alfred Nordmann (2018, 2020), whose approach focuses on the earlier work of Wittgenstein and identifies opportunities within the *Tractatus* to think about technology and arrive at a "grammar of things". Nordmann (2018) differentiates between two Wittgensteinian concepts of *world*, the world as the "totality of facts" and the world as a "limited whole", the former being the object of the problems of philosophy, the latter providing access to the world for a philosophy of technology. Through this lens every artifact on its own can be viewed as a limited whole:

> This alternative conception of "the world" does not necessarily refer to the "whole world" in a cosmic or planetary sense but takes any limited whole to be a world unto its own. If a clockwork, an artwork, any socio-technical system, the whole of God's creation, or a particular situation in human experience can be contemplated as a limited whole, each of these works or objects of contemplation is a world – and any world is a work not in the sense of labour, but in the sense of being a composition of things such that these things work together in a coherent, effective, or meaningful manner. […] [T]he contemplation of a limited whole affords knowledge of right and wrong ways of fitting things together. In a musical composition, a certain note 'doesn't work here' and does not agree with an acquired competence as well as a sense of right and wrong, of better and worse. Likewise, a composition of cogwheels, gears, and levers has to meet the criterion of compositional rightness. (Nordmann 2018, pp. 339-340)

A philosophy of technology would then need to explicate these working orders of things – this grammar of things – which makes up a work as it affords attunement. The question then arises of "what makes for the right, successful, felicitous arrangement of notes, symbols, or things, and what are the grounds for the normativity of [sic!] 'rightness' of composition?" (Nordmann, 2018, p. 344).

This grammar in the sense of a working order that constitutes a work seems to be located at the surface level of grammar as it was sketched out by Coeckelbergh. The examples Nordmann provides can all be captured by syntax: How things interact in a work – be it cogwheels in a clockwork, notes in a musical composition or rules and symbols in an algorithm – is merely a syntactical matter. Nonetheless, Nordmann still accounts for the normativity of grammar and – although he uses the term *grammar* in a narrow sense – seems to leave room for interpretation concerning some kind of interaction between working knowledge and a form of life: "To acquire working knowledge and to achieve attunement is to know or enact that grammar of things – which then provides a form of life or 'technology game'" (Nordmann, 2018, p. 343). However, later work by

Nordmann on the "grammar of things", suggests that his conception of a grammar of technology seems to be exhausted by the notion of syntax or surface grammar:

> "A sentence, statement, or proposition is a linguistic structure which can express a fact and how a thing appears to us. A clockwork, waterwork, or steelwork also provides a structure in which things can express themselves – where they reveal not what they are or how they appear, but what they can do or effect in concert with other things. […]
> There is a grammar, then, for mechanical engineers. It is a grammar of things and works in analogy to the grammar of words and sentences. It allows them to properly arrange elements such that they can form a meaningful whole. It also allows them to judge whether the resulting structure is well-formed. […]
> These are grammars in the sense of providing principles. (Nordmann 2020, pp. 88-89)

Although I will discuss possibilities of navigating the mentioned room for interpretation, it seems appropriate to refer to this theory by the term *syntactical technogrammar*.[1] Having sketched out these two different approaches towards a grammar of technology, two questions now arise: How can surface and depth grammar best be conceptualized, taking into account the whole of Wittgenstein's philosophy (of language)? And which conception of technogrammar proves more useful in building a framework for a philosophy of technology?

DEPTH GRAMMAR IN WITTGENSTEINIAN PHILOSOPHY

The notion of depth grammar in Wittgenstein's philosophy is not uncontroversial and plays into the ongoing debate of the significance of Wittgenstein's turn and the possible coherence between his earlier and later work. Tamara Dobler (2011: 76) identifies two main interpretations of surface and depth grammar: the first stresses continuance in Wittgenstein's work and interprets depth grammar as a "more ramified, more exhaustive and restrictive version of surface grammar" while the second treats *depth* as describing new dimensions of language use. These two conceptions of depth grammar roughly align with the two presented theories of a technological grammar. Nordmann's syntactical technogrammar concerns only aspects that would fall under the umbrella of surface grammar as described by Mark Coeckelbergh, whose theory of deep technogrammar on the other hand stresses the aspect of depth adding another dimension to the notion of grammar.

Coherence and Syntax

The portrayed theory of syntactical technogrammar rests only on the earlier work of Wittgenstein, hence explicit claims regarding the relationship to his later work – in particular the possibility of a wider, deeper grammar – are not made. As Wittgenstein's

[1] In her contribution comparing musical composition to that of computer programs, Lisa Borchert (2023) presents a view that provides for a non-conceptual semantics of syntactic principles.

conception of grammar has presumably evolved since writing the *Tractatus*, though, it seems appropriate and fruitful to relate the notion of syntactical technogrammar to the complete work of Wittgenstein in order to afterwards discuss possible limits of its scope.

What Dobler (2011) calls the "standard view" of Wittgenstein's conception of use and grammar is most prominently articulated by Peter Hacker and construes grammar as universally applicable rules:

> Grammar] consists of rules which function as standards of correctness or norms for correct application of words. The rules of grammar determine which combinatorial possibilities are licit, and which aren't; they, thus, distinguish meaningful from meaningless sentential constructions. But they also function as norms we follow when we speak meaningfully. Rules are inherently general and valid for the multiplicity of occasions. On this view, meaningful uses of language (understood both as combinatorial possibilities of words and particular instances of speech) are necessarily rule governed: there is no such thing as a meaningful use independently of rules. (Dobler, 2011, p. 48)

This view of grammar seemingly coincides with the syntactical conception of technogrammar: meaningful uses of technology are necessarily rule-governed – "Those who know [the grammar], can see or hear immediately what works and what doesn't" (Nordmann, 2020, p. 89). In this sense the grammar of technology is normative as it provides rules that define which arrangement of things is well-formed and which one is not. Grammar in a Wittgensteinian sense, then, can be thought of as a continued concept within a more or less coherent work, the later notion of grammatical rules being "the direct descendants of the 'rules of logical syntax' of the *Tractatus*. Like the rules of logical syntax, rules of grammar determine the bounds of sense" (Baker & Hacker, 1985, p. 40).

While surface grammar in this interpretation concerns typical syntactical categories (verbs, nouns, adjectives, …), depth does not constitute a new dimension of grammar, instead it accounts for the fact that grammatical rules – while still being universally valid – are tied to use:

> For instance, according to its surface grammar "to mean" belongs to the ("largely syntactic" as Hacker sees it) category of action-verbs […]. However, once we inspect its depth grammar – that is, the combinatorial possibilities and impossibilities of this word with other expressions in a greater number of constructions – we see that it is mistaken to take it as an action-verb. (Dobler, 2011, p. 56)

Akin to how the depth grammar of a word can be explored by looking at its use, "i.e. logico-syntactic employment, in a broad range of sentences, not merely at its superficial 'form'" (Dobler, 2011, p. 56), according to syntactical technogrammar, facts about a thing can be obtained by implementing it in technological contexts, resulting in a similar distinction:

> A clockwork, waterwork, or steelwork also [like a sentence] provides a structure in which things can express themselves – where they reveal not what they are or

> how they appear [i.e. their surface grammar], but what they can do or effect in concert with other things [i.e. their depth grammar].” (Nordmann, 2020, p. 88)

Thus, this conception of technogrammar can be reduced to (logico-)syntactical rules, which are occasion-invariant, but nevertheless only explorable by examining how things are used.

Turn and a New Dimension

The standard reading of PI §664 concerning surface and depth grammar has been criticised for falsely ascribing aspects of what actually would need to be considered surface grammar to depth grammar. According to this critique, every kind of “rules of *logical* grammar which impose restrictions on the *combinatorial possibilities of words* in framing *meaningful* (significant) sentences” fall under the umbrella of surface grammar (Baker, 2001, p. 308) – in contrast to the standard view, which differentiated between immediately apparent and use-based rules of composition and placed the former on the surface and the latter on the depth level of grammar. According to Baker, the former reading would be more on par with Wittgenstein’s inquiry in the *Philosophical Investigations*:

> This [subsuming all (logico-)syntactic grammar that is of interest according to the standard reading under *surface grammar*] would connect “surface grammar” with a major preoccupation of the philosophers who are the principal explicit targets of critical investigation in PI: namely Frege, Russell, and the author of TLP and RLF. (All three of them focussed on the logical analysis of propositions, even though all three schemes of analysis were logically incommensurable.) […] Rules for constructing *significant* sentences could be precisely what Wittgenstein meant to pick out there by the phrase “surface grammar”, hence *not* by the phrase “depth grammar”. If so, his declared intention to describe depth grammar was presumably to *differentiate* his later method of describing the grammar of our language from the standard method of constructing a classification of words into logical categories or types […]. His primary concern in ‘depth grammar’ must then be *different* from pointing out category-mistakes or clarifying type-restrictions or combinatorial possiblities [sic!] and impossibilities. (Baker, 2001, p. 308)

This conception of grammar, then, would mark a turn in Wittgenstein’s thinking as “his concern with ‘depth grammar’ would put emphasis on aspects of his investigations which have no counterpart there [TLP]” (Baker, 2001, p. 316). It would furthermore elucidate Wittgenstein’s usage of *depth* as depth grammar, and would open up a new dimension of grammar compared to mere surface-level rules of combination and composition. As for what this dimension might be, Baker offers several options Wittgenstein emphasizes in the PI:

> “(1) Differences in the ways individual words are integrated into human activity, the different ways of *operating* with words.” (Baker, 2001, p. 309)

> “(2) Differences in the ways *complete* sentences are *employed*.” (Baker, 2001, p. 310)

> "(3) The dependence of the question whether a particular utterance of a well-formed sentence (one having unexceptionable *Satzklang*) really makes sense (i.e. has a role in a language-game) on the *circumstances* surrounding its utterance." (Baker, 2001, p. 311)

> "(4) The nonsensicality (uselessness) of a proposition based on a *wrong calculation*." (Baker, 2001, p. 312)

> "(5) The construction of imaginary or hypothetical language-games as objects of comparison." (Baker, 2001, p. 313)

> "(6) Concern with *pictures* which individuals may associate with the uses of particular words." (Baker, 2001, p. 314)

Some of these dimensions are also captured by the depth dimension in deep technogrammar, which covers integration into human activity (1), grammars concerning the employment of artifacts (2) and occasion-sensitivity (3). While it certainly could be argued that (4)-(6) are covered by deep technogrammar as well, this would demand an extensive discussion which is not needed to make the point that this interpretation of depth grammar falls in line with deep technogrammar, as (1)-(6) are only suggestions for what the deep dimension of grammar *could* be. Furthermore, Mark Coeckelbergh (2018) stresses that "form of life" is a central part of depth grammar, which describes a holistic whole containing multiple language/technology games (pp. 1506-1508). Although Baker does not explicitly mention this aspect of holism, the embeddedness of language/technology use in human activity can be extrapolated to some extent. Moreover, Dobler (2011) – although similarly not applying this term in a holistic sense – identifies the lack of exactly this analysis of the dimension of human activity to be one of the main reasons for why the standard reading is insufficient as well as the constitutive aspect of Wittgenstein's turn (p. 165). While the standard reading does not discard this social aspect, it is interpreted as "part of the framework within which a language-game is played" (Baker & Hacker, 1985, p. 243) instead of being part of grammar itself. Grammar, with its occasion-insensitive rules, then, does not capture the difference between sense and nonsense regarding certain uses of language to which the categories (1)-(6) apply. Consider the following example in regard to (3):

> "[I]f somebody had an arm 10 feet long and put it down a hole, we would have no difficulty in making sense of his statement "I feel water ten feet underground"; but if a normal human being makes the same statement in similar circumstances, we could make no sense of it." (Baker, 2001, p. 311)

To what extent this insufficiency of the standard view on surface and depth grammar is relevant in regard to the grammar of technology – syntactical technogrammar – will later be taken up and examined further.

Depth and Transcendence

Being presented with these two different interpretations of the Wittgensteinian notion of surface and depth grammar, two problems arise. The first reading, stressing

coherence in Wittgenstein's work and the syntactical nature of rules, does not account for the social dimension of use – the embeddedness of use in human activity – and postulates rules that are occasion-insensitive. The second reading, on the other hand, opens up an additional dimension of grammar and hence proposes a turn in Wittgenstein's philosophy, especially regarding his conception of grammatical rules. This evokes a metaphysical feeling of a more fundamental set of rules lying beneath the surface – in particular the interpretation by Coeckelbergh, who identifies depth grammar as being "transcendental". This metaphysical conception of depth would be quite contrary to Wittgenstein's analytic inquiry as "Philosophy simply puts everything before us, and neither explains or deduces anything. […] For what is hidden, for example, is of no interest for us" (Wittgenstein, 1953/2009, §126, 55e).

Though Coeckelbergh introduces the notion of depth grammar being transcendental in a (post-)Kantian way, denoting 'conditions of possibility' (*Bedingungen der Möglichkeit*), he still employs vocabulary that evokes a perception of hiddenness: "[D]epth grammar is less easy if not impossible to fully make explicit" (Coeckelbergh, 2018, p. 1508). The image of transcendence can be avoided by further unpacking what is meant by *transcendental*:

> [L]anguage games and forms of life are transcendental conditions of language use and meaning in particular situations. They "make possible", structure, and limit a particular use of language and its related meaning. Without these games and forms of life, a particular use of language would be meaningless. (Coeckelbergh, 2018, p. 1507)

Coeckelbergh (2018) stresses that said transcendental grammar is neither "in the head" nor in a "noumenal realm", but "rather immanent" as it "lives in concrete use, in human activities and practices" (p. 1508). A better understanding of how this transcendental, yet immanent grammar arises, can be gained via the aspect of performance in technology use as emphasized by Coeckelbergh and Funk (2018), who "propose to interpret transcendental depth grammar as the grammar of human performances – performances that are more than language and enable meaningful usage of words" (p. 183). Thus, technological performances – uses of technology, which constitute its meaning – are only meaningful if they are made possible by this grammar:

> Performance is about skilled use of words, body, and tools, and this is only possible in a meaningful way and in a successful way if and since there is already a socially and culturally shared whole of largely implicit know-how that forms the linguistic, bodily, and technological "grammar" which shapes and *makes possible* a particular use-performance. (Coeckelbergh & Funk, 2018, p. 183)

This notion of technological performance that is only made possible by culturally shared know-how adheres to the Wittgensteinian concept of rule-following: in PI §202 Wittgenstein refers to rule-following as "practice" and concludes his argument with the observation that it is impossible to follow a rule privately (Wittgenstein, 1953/2009, §202, 87e-88e), hence opening up a social perspective and tying grammatical rules to a whole linguistic (technological) community. The mentioned difficulty to make depth grammar

explicit can also be captured by the problem of rule-following, eliminating the metaphysical quality that might have been associated with it.

In this sense, the grammar is already there, immanent, as it lives in concrete practices performed by a wider community. *Depth*, therefore, describes the embeddedness in social practice that goes beyond merely syntactical rules – the implicit character of rules concerning depth grammar naturally arises via the problem of rule-following.

TOWARDS A DEEP TECHNOGRAMMAR

Thus far I have presented two conceptualisations of technogrammar, correlating – as I have interpreted them – with two interpretations of surface and depth grammar. While deep technogrammar at first sight appears to make metaphysical claims about some kind of hidden structures that underlie grammatical rules, *depth* rather concerns a new dimension, namely the embeddedness of use within wider social practice. Syntactical technogrammar, on the other hand, lacks said dimension by reducing grammar to occasion-insensitive rules. Since this (standard) view only insufficiently captures the meaning of language – as seen by the 10-feet-long-arm example –, it is yet to be examined whether the same critique applies when this conception of grammar is employed to analyze technology.

When unfolding his theory of a – in my view, syntactical – grammar of technology, Nordmann (2020) draws on a certain notion that is constitutive for the dimension of depth in deep technogrammar: different technology games (e.g. architecture, pharmacy, electrical and software engineering) make up different grammars. It is also mentioned that acquiring working knowledge – which does not seem to be implicit in the same way know-how is in deep technogrammar – provides technology games and a form of life (Nordmann, 2018, p. 343). It seems, though, that – analogously to how the standard view on surface and depth grammar accounts for the relation to use and human activity – this is only "part of the framework within which a *technology*-game is played" instead of an actual part of the grammatical structure of a technology (or *work*). The example of musical compositions, which both Nordmann and Coeckelbergh utilize, further supports this interpretation and illustrates the difference between the two grammars of technology. Syntactical technogrammar does acknowledge different musical languages which consist of different grammars, but constricts those to "principles of composition":

> These are grammars in the sense of providing principles of composition […]. Music provides the most obvious example. There is counterpoint, romantic harmony, twelve-tone music – each with its own principles of composition that tell composers and listeners whether the tones are rightly arranged so as to carry the musical logic forward and so as to produce a desired effect. (Nordmann, 2020, p. 89)

Deep technogrammar, on the other hand, stresses the performance character of technology and the grammar being transcendental:

> Music is again a good example [of surface and depth grammar] since it involves these different kinds of grammar: the syntactical grammar of musical language/logic, for example, but also the grammar and games of styles, and indeed the depth grammar of an entire music culture, such as the rock culture, which constitutes a form of life. […] [M]usical grammars and cultural embodiments in music, but also music technologies, constitute *transcendental* forms of life. For example, the e-guitar becomes a condition of possibility of how to talk with and about music. Of course there is a concrete artifact, such as a Stratocaster guitar or tube amplifier. But there are also concrete skills that are enabled by these instruments and at the same time shape the possibilities of how to use it – what we called "innate technique" – and on the link between these skills and techniques and the form of life as a transcendental condition. Before a musician starts playing and performing, there is already a form of life which provides grammars that make possible the playing and shape particular performances, techniques, and styles." (Coeckelbergh & Funk, 2018, 186-187)

What immediately strikes one's attention are the examples of concrete distinct musical grammars both authors introduce: syntactical technogrammar describes grammars that consist in compositional rulesets, while deep technogrammar establishes a wider conception of what a musical grammar might be. Thus, it is unclear how, for example, the grammar of rock music could be properly captured by syntactical technogrammar. Even the examples Nordmann lists are illuminated by deep technogrammar more successfully: twelve-tone music emerged from a music performing community with existing grammars – implementations of twelve-tone techniques *made possible* by those grammars. Hence, analysis of conditions of possibility of technologies, transcendental grammars, could not only lead to further insights about said technologies, the latter must be understood as essentially being bound by these depth grammars. This is also shown by the aforementioned example of a navigation device, which would have no meaning at all outside of a form of life where certain destinations are to be reached. Syntactical technogrammar, therefore, proves insufficient in properly capturing technology.

CONCLUSION

In this paper I have presented two conceptualisations of a Wittgensteinian grammar of technology. Syntactical technogrammar concerns rules of composing things within a technological work, while deep technogrammar stresses that the meaning of a technology can only be understood by taking into consideration wider grammars – forms of life – that are social and transcendental. It has been shown that syntactical technogrammar falls in line with an interpretation of Wittgenstein's work which views the latter as more or less coherent, in particular regarding the notion of grammar. Surface grammar, then, describes apparent syntactical categories while depth grammar consists of rules regarding the correct employment of words/things in a variety of linguistic/technological constructions. By remaining on a merely syntactical level of occasion-invariant rules, this interpretation

not only fails to do Wittgenstein's later writing of grammar justice, but also seems to fall short of appropriately describing technology.

Deep technogrammar, on the other hand, recognises the turn in Wittgenstein's thinking by ascribing all rules of syntactical technogrammar to surface grammar and construing *depth* as opening up a new dimension which is social and transcendental. In spite of – at first sight – evoking a rather metaphysical feeling, this conception of *depth* is still immanent as it lives in concrete technology uses performed by a wider community. This analysis of depth grammar – as part of deep technogrammar – opens up new and fruitful perspectives to think about technology.

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