

## **ANT Ethics in Professional Communication: An Integrative Review**

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**ABSTRACT:** This integrative review synthesizes the literature on addressing morality and ethics in actor-network theory (ANT). When humans and non-humans have equal agency (self-driving cars, diagnostic algorithms, for example), how do we evaluate ethical and moral implications? What perspectives or practices can professional communicators adopt? Examining 38 articles published in communication journals about ethical dilemmas involving technologies such as self-driving cars and social networks, this meta-analysis revealed insights about how ANT impacts ethical deliberation.

**Keywords:** Actor Network Theory (ANT); Professional Communication; Morality and Ethics in Communication

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### **Introduction**

Applications of artificial intelligence, machine learning, and big data analytics abound in practically every industry and sector. As these technologies proliferate, particularly for the purpose of making decisions based on analytics, it falls to professional communicators to translate those findings to the public and to policymakers. It also falls to professional communicators to remind engineers, designers, and technologists of the human consequences of these technologies, and the limitations of the insights that they provide.

This paper uses an integrative review to consider normative frameworks for addressing morality and ethics in actor-network theory (ANT). When humans and non-humans have equal agency (self-driving cars, diagnostic algorithms, for example), how do we evaluate ethical and moral implications? What perspectives or practices can professional communicators adopt? This paper offers recommendations for how we can reframe and address the new ethical dilemmas presented by activity networks of humans and non-humans. Does post-critique preclude ethical reflection? If so, what perspectives or practices can critics adopt as a corrective?

To answer these questions, this paper performs an integrative review of articles published in communication journals about how to handle ethical deliberation about technologies that impact communication, such as multimodal interfaces and social networks. The findings show how ANT impacts ethics for business and professional communicators and the recommendations offered by the literature regarding how professional communicators can reframe and address the new ethical dilemmas presented by non-human agents involved in communication processes.

### **Background: Importance of ANT Ethics to Professional Communication**

Artificial intelligence (AI) and machine learning are two primary technologies that enable non-human agents to perform. Both are emerging as important drivers of business and economic growth. Both are also important examples of how non-human agents are changing how we work, how we consume products, and how we make decisions at work. These algorithms help refer customers to other products. They help businesses find trends in their data to make decisions. They also help them sift through mountains of information to find key insights. According to Allied Market Research (2019),

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the global artificial intelligence market will reach \$169,411.8 million in 2025, from \$4,065.0 million in 2016, growing at a compound annual growth rate of 55.6% from 2018 to 2025. Artificial intelligence has been one of the fastest-growing technologies in recent years in industries such as media & advertising, retail, telecom & IT, healthcare, automotive & transportation, and others, including agriculture, law, and educational institutions. According to Grand View Research (2019), the global machine learning market size was valued at USD 6.9 billion in 2018 and will achieve a compound annual growth rate of 43.8% from 2019 to 2025. The market includes banking, finance, insurance, healthcare, retail, law, advertising and media, agriculture, manufacturing, automotive, and transportation, among others. Emerging technologies such as artificial intelligence and machine learning are changing the way industries and humans work. They are also integrated into the design of products that companies produce and the decisions that companies make. Business communicators must explain these technologies to customers and clients, use these technologies to make communication policy and decisions, and assess the benefits and risks of both.

Actor-network theory (ANT) is a social theory where agents within a domain of work function in constantly shifting networks of relationships. All agents involved in a social situation—human and non-human agents, for example—can exert the same level of influence. Using ANT, scholars have explained how scientific and technical changes and controversies (medical diagnoses, nanotechnology, climate change) arise from interactions between people and technologies (Besel, 2011; Graham, 2009; Macnaghten, Kearnes, and Wynne, 2005; Venturini, 2010; Walsh, 2014). In this way, ANT parallels evolutionary theory; for both, human and non-human entities (or technologies) influence events and equally provoke change (Miettinen & Virkkunen, 2005). ANT also eschews the Kantian idea of a universal mind that reasonably constructs guidelines for behavior and action (Latour, 1999). The question arises, then, when networks break down when lives and property are compromised, who is to blame if human and non-human agents are both complicit? Currently, traditional ethical theories discuss human agents; the entire enterprise of ANT seems to run counter to this idea.

However, ANT need not preclude ethical frameworks other than utilitarian consequentialism or biological determinism, where evolution rules out the possibility of acting freely or assessing blame (Liebert & Schmidt, 2010; Davies, 2009). Dewey's consequentialist instrumentalism (where intelligence evolves from

following to evaluating inclinations) or Darwin's idea of non teleological virtue (where moral behavior evolves from participation in social life to transactions between humans and environments) might afford space for considering reflection and interiority (that differentiates human from non-human actors) without violating ANT's main tenet that human and non-human agents are equally powerful and agentic (Waelbers & Dorstewitz, 2014). This integrative review synthesizes the frameworks currently used by business and professional communication scholars as they perform ethical analyses of actor networks in our field.

### **Background: Can traditional ethics address non-humans?**

Traditional ethical theories put people first. Normative, descriptive ethics traditional schools usually ground themselves in human rationality, desire, volition, motivation, or reason as a foundation of moral decision making. Virtue theories such as Plato's cardinal virtues of wisdom, temperance, justice, and courage or the Ten Commandments and Golden Rules provide heuristics or rules of good behavior. Duty or deontological theories cast obligations on all members of the human race based on the good of all. They are non-consequential rules insofar as they are applied regardless of the consequences that follow. Kant's categorical imperative of treating people as an end, not simply means to an end, applies here, as do Ross' prima facie duties of fidelity, reparation, gratitude, justice, beneficence, self-improvement, and more. Consequentialist theories elevate the consequences to others or the agent of actions in a cost-benefit analysis and to choose the behavior that brings the most benefit to most people. Utilitarianism (a la Bentham and Spock) is a consequential approach to ethics that gives priority to the maximum quantity of goods produced by an action. Each of these theories prioritizes the human agent and their decision making calculations that weigh good, interest, and motivation in making an ethical decision.

These theories essentialize human individuals, and, for this reason, some critics think that they are prone to egotism. Egoism might underpin even superficially altruistic-oriented schools such as utilitarianism, per Thomas Hobbes, and others. The desire to appear or become generous, selfless, or other-oriented motivates actions of sacrifice and the greater good. Furthermore, it has been historically and notoriously difficult to differentiate moral valuations from emotional ones. Hume argued that passion and emotion enslave reason. These approaches to ethics also present metaphysical

propositions that moral values align with truth or greater good in some incarnation or another. From this perspective, traditional ethical theories could evaluate non-human agents to the extent that they have human characteristics (i.e., desires and intentions) and standing in society.

### **Background: Are ethics and ANT incommensurable?**

Several tenants of ANT preclude human priority. First, in ANT, humans and non-humans are all equal agents, and “agency is the interactions between them, rather than the exclusive entitlement of one or the other. Second, human and non-human agents are not dichotomous. Humans are not always rational, and non-humans are not always instrumental in their exchanges and interactions. Third, transactions and mediations that lead to transformations replace intention as a propellant of action. Humans use technology to reach a goal, thereby translating the ends from ideal to mediated and affected by the technology and its constraints. Actions are the meditations of several human and non-human agents. These actions become black boxes when the joint production of several human and non-human actions and mediations becomes obscure, and the composite contributions become invisible. At this point, action and responsibility disperse across a multilayered system. Human responsibility and, hence, morality are not the only priority in this complex network of actants. Agency implies changing a state of affairs. ANT also requires studying networks of actants over time, underscoring the changing nature of ethical valuations in the process. Fourth, focusing on human intention would also misrepresent social dynamics, as human subjectivities are what they do.

### **Background: System or Network Ethics**

Dewey and Darwin propose versions of system ethics, where the entire system—not just each agent—has ethical responsibility. First, both thinkers see ethics as inherently social. According to Waelbers and Dorstewitz, Dewey’s consequentialist instrumentalism (where intelligence evolves from following inclinations to evaluating inclinations) or Darwin’s idea of non-teleological virtue (where moral behavior evolves from participation in social life and transactions between humans and environments) might afford space for considering reflection and interiority (that differentiates human from non-human actors) without violating ANT’s main tenet (Waelbers & Dorstewitz, 2014).

Both thinkers’ adaptations of utilitarian theories share similar precepts. Moral choices always and already are the product of social, environmental, and individual interactions rather than detached skip logic of rationality in individual consciousnesses and experiences. Networks enable agency and moral agency. From a Darwinist theory of morality, natural processes and causal coupling supplant intention and purpose. For Dewey, dynamic, natural processes give way to phases of equilibrium and other phases of problematic situations that compel networks and their agents (organisms) to respond.

Second, knowledge in these theories is a method of intelligence interacting with the social environment rather than someone’s rationalization making decisions about how to behave. Consequential instrumentalism is the perpetual refinement of dispositions and habits through natural processes. Likewise, Darwinian ethics also posits similar mutations in evolutionary science toward better angels—i.e., how social structures and sympathy evolve from the benefits of collectives to species sustenance. Evolutionary science says that humans have social instincts and, in turn, mental, social, and environmental interactions shape moral proclivities and judgments. From this perspective, non-human agents operating in a dysfunctional and dangerous system would not have to have individual remorse. Instead, the programmers, public, and other stakeholders involved would also be responsible for moving toward moral good. ANT rethinks post-critics from these theories of networked morality, the goal of ANT criticism then could then be not only to describe the orchestration and work of mediation and transformation that propels agency in a network but also to critique whether the architecture of those transactions facilitate moral agency and change beyond inevitable fault or error that is predetermined by the limitations of the human and non-human actants. The question remains, however, how are business and technical communication scholars holding actor networks to task about their ethical conduct?

### **Methods: Integrative Review**

Study characteristics included peer reviewed articles and excluded theses and books, primarily because the former are not peer reviewed, and the latter do not reflect the largest amount of scholarship on the subject or scholars who write about the subject. They also included studies published in journals of communication and English language only published from 2005 to 2019. EBSCO, Web of Science, and Google enabled finding articles and identifying sources.

Library holdings limited search and collection processes by way of accessing the full text versions of the articles. Search terms included actor-network theory, ANT, Latour, moral, and ethic (root words). Screening involved reading database previews and article abstracts for eligibility. Once eligible studies were screened, reading the content of the entire article revealed the extent to which they identified ethical problems and dynamics. Eliminated articles included those that did not detail ethical problems, theories, or dynamics more than twice in the article. All paragraphs that developed arguments or main points about ethical dynamics were compiled in a spreadsheet. Taguette software was then used to code data, using an inductive coding analysis to handle and interpret data and to combine the results of studies (Fereday & Muir-Cochrane, 2006). Tropes by Semantic Knowledge—a text analysis, qualitative analysis, and text mining software—helped count and confirm themes.

**Results: Integrative Review**

Overall, 211 studies emerged from the search. Excluded studies were part of a book or an entire book. They did not contain more than two brief mentions of ethics or moral dimension. They were not pertinent to the study insofar as they did not discuss Latour's construction of the actor-network theory. They were duplicates, book reviews, dissertations, or theses; or, they were unavailable or inaccessible. The review includes the thirty-eight (n=38) remaining studies. These studies used as case studies applications of technology, including online games, road signs, information systems, social media, film festivals, driverless cars, virtual reality, citizen science, data abstraction, social bots, surveillance, algorithms, emails, and research. Table 1 presents the study inclusion and exclusion chart.

**Table 1.** Inclusion and Exclusion Criteria

Count	Status
69	excluded: irrelevant
28	excluded: repeats
23	excluded: books
22	excluded: proportion

22	excluded: thesis
7	excluded: unavailable
2	excluded: book reviews
<b>38</b>	<b>included</b>
211	total

**Table 2** presents the technology or nonhuman agents involved. The research included nonhuman agents that pertain to several fields, including research and design, digital media, computer science and artificial intelligence, retail and communication design such as Amazon, entertainment technology such as Hulu, medical technology, environmental technology, and automobiles.

**Table 2.** Technology Represented in the Literature

Nu mb er	Technol ogy	Citations
7	AI	(Adams, 2014; Andreassen & Dyb, 2010; Ask & Sørensen, 2019; Bakardjieva & Gehl, 2017; Bencherki, 2012; Besel, 2011; Buzato, 2017)
2	Cars	(Caronia & Cooren, 2014; Chilvers & Pallett, 2018)
5	Commu nication	(Cole & Littlejohn, 2018; Craig, 2010; Forlano, 2019; Frost, 2013; Nafria, 2011)
3	Digital media	(Fuchs, 2009; Lutz, Schöttler, & Hoffmann, 2019; Neff & Nagy, 2016)
6	Entertai nment	(Giustiniano & Bolici, 2012; Guilbeault, 2016; Hidri, 2019; Kelly &

		Maddalena, 2016; Potts, 2010; Stock et al., 2017)			
4	Medicine	(Kennedy, 2018; Lee, 2019; Leenen & Penders, 2016; Penkler, Felder, & Felt, 2015)	<b>Shared ethical values and consequences in networks</b>	438	In particular, values, facts, and artefacts are entangled (Liebert and Schmidt, 2010, p. 68)
4	Research & design	(Meisenbach, 2017; Potts, 2009; Pöttsch, 2017; Read, 2011)	<b>Human agency and agents play a part</b>	388	Moreover, objects and their human agents combine to perform a third agent, called a "hybrid agent" (Turnage 2016, p. 205).
4	Environment & mining	(Taffel, 2015; Turnage, 2016; Liu & Goodnight, 2016; Walsh, 2014)	<b>Nonhuman agency and agents play a part</b>	321	Social studies of technology have long held the idea that technology is never neutral regarding politics or values. Accordingly, an increasing number of researchers have been taking nonhumans seriously—for instance, in their analyses of algorithmic culture (Waldherr et al., 2019, p. 4722).
3	Computer science	(Sandvig et al., 2016; Waldherr, Geise, & Katzenbach, 2019; Willson, 2017)			
38	Total				

**Table 3** presents the frequency of sentences representing the most common themes that emerged, including the importance of practical consequences; shared ethical values and consequences in networks; human agency and agents that play a part in the network; nonhuman agency and agents play a part in the network; need for reflection and argumentation in network ethics; mutual agency in actor networks; ethics defined and redefined in network ethics; and policies and rules for all network actors to maintain ethics.

**Table 3.** Sentences Frequencies of Codes

Code	Number of Sentences	Example			
<b>Importance of practical consequences</b>	532	And yet, the working of algorithms has wide-ranging consequences for the shape and direction of our everyday (Wilson, 2017, p. 140).	<b>Need for reflection and argumentation in network ethics</b>	300	Forms of reflection can be 'built in' as a new practice within the production of services or between R&D, design activities and actual production (Miettinen and Virkkunen, 2005, p. 451)
			<b>Mutual agency in actor networks</b>	215	Today, computer algorithms play a critical role in producing and curating our communications and shared culture (Sandvig et al., 2016, p. 4973).
			<b>Ethics defined and redefined in network ethics</b>	149	The question asks specifically about a certain kind of finite process and not about its goal. This is not to

		say that the goal is unimportant, yet asking about the ethics of the goal is simply a different question than considering the ethics of an algorithm (Sandvig et al., 2016, p. 4976).
<b>Policies and rules for all network actors</b>	143	It is up to technical communicators to point out these issues, help shape new policies, and be those users' advocates if we are to see improvements in the distribution of this content (Potts, 2010, p. 313).
<b>Value of bodies and materiality in network ethics</b>	105	Annemarie Mol (2003) theorizes patients' bodies as "complex wholes": network effects (i.e., objects) in themselves that are also points of intersection for multiple other networks (Kelly and Maddalena, 2016, p. 289).
<b>Cases to illustrate network ethics</b>	87	Finally, the case study presents an example onto which to map divergent concepts which exist within contemporary materialist approaches and highlighting some of the key political and practical discrepancies between them (Taffel, 2015, p. 20).
<b>Lingering questions about network ethics</b>	84	The question of agency is of particular interest to rhetorical studies in technical communication (Read, 2011, p. 372).
<b>Responsibility</b>	57	Discourse goes critical

<b>for ethical judgments in network ethics</b>		when self-responsibility in relation to nature becomes directed toward seeking accountability of agents or agencies that fail to protect the environment adequately (Lui and Goodnight, 2016, p. 5547)
<b>Training and education in network ethics</b>	19	The effort to raise user awareness faces the potentially insurmountable challenge of training users to spot bots in an environment that biases them toward perceiving bots as agents (Guilbeault, 2016, p. 5006)

Most of these studies distributed moral and ethical responsibility across the network. **They described human (n=388) and nonhuman (n=321) agents as equally responsible.** For example, a discussion of social bots asserted the following: "Users of technologies, at least partly, delegate their agentic properties to devices, creating a proxy agentic relationship between individuals and artifacts. In other words, intention-setting practices are based on the symbiotic interaction of the users and technologies" (Neff & Nagy, 2016, p. 13). Humans cede moral responsibility when they engage with technology. Or, as other studies indicated, they share equal responsibility with their nonhuman interlocutors. For example, a discussion of social media dynamics concluded that just because we as humans are "on the passive site...does not necessarily reduce our moral commitment to the world we inhabit and share with things. Rather, it potentially enlarges, expands, or broadens this responsibility as it invites us to acknowledge our role of passers and therefore also to feel responsible for what other human and nonhuman entities do and accomplish - sometimes through us" (Caronia & Cooren, 2014, p. 16). Passivity on the part of human (or nonhuman) agents still renders them complicit in the moral and ethical fallout of interactions and actions. **These studies underscored the social and group dynamics that underpin ethics (n=438).** Ethical values are shared, as are their consequences. A discussion of

online games found that “collective enactments of technology need extensive managerial efforts unless the group shares a coherent and uncontested rationale for playing, thus being a moral community...[W]e have observed two main forms of collective domestication: the moral community and the managed approach” (Caronia & Cooren, 2014, p. 85). Successful ethical interactions with technology involve either shared or imposed mutual rules of ethical engagement.

Per the literature, these ethical collaborations, and delegations, in turn, open new possibilities for revising and reinterpreting ethics. **There were several instances of the articles defining and redefining ethics in the context of ANT (n=149).** One study of organizational policies found that “ANT makes available new ways of translating both human and nonhuman actors in the system. First, in the face of moral differences, objects are allowed to speak in new ways and create new connections and interactions that make constructive outcomes possible. Second, such discourse allows new coorientations to emerge within the system” (Cole & Littlejohn, 2018, p. 365). Policies that regulate human and other resources instantiate solutions to prospective problems and conflicts. **They also have to represent disparate and seemingly incommensurate actions and needs (n=143).** In doing so, in aiming for constructive interactions, they create a mutual space where new, hybrid values and responsibilities emerge. Actor-network ethics also require a close reexamination of the ways that ethics privilege a particular kind of human ethics. A study of Enron's email as a mediating technology found that “The metaphors of ethical and human values...introduced new discourses focusing on ethical and human values with the potential to disrupt the mechanistic, inhuman Discourses, therefore challenging existing power structures—if at least temporarily.” (Turnage, 2016, p. 212). Interjecting nonhuman agents casts into stark relief the often inhuman behavior and actions of human agents in the actor network. **Ethical interactions between nonhumans and humans invite ethical reflection (n=300).** A study of research methods in professional communication found that “we rarely make moral judgments of the basic (non-reflexive) animal instinct of a shark attacking a surfer. Reflexive agency raises the question of whether we only assess ethics when individuals are acting reflexively” (Meisenbach, 2017, p. 149). Asking questions about whether humans or nonhumans are ultimately responsible for the ramifications of their actions exposes unstated assumptions about whether reflex or rational actions warrant ethical judgement and verdicts (n=84). The literature proposed newly created ethical models, as well. For example, a study of algorithms investigated

“whether the algorithm in a computer system is improper, unethical, or illegal in itself,” and it stressed “the importance of developing practical algorithmic ethics that addresses virtues, consequences, and norms” (Sandvig et al. 2016, p. 1). Algorithms are seemingly invisible; they perform actions without our full awareness. Ethics research in professional communication can expose and interrogate the unstated assumptions and inner workings that underpin them. **Indeed, the literature review revealed studies that assigned ethical responsibility to the nonhuman agents themselves (n=215).** A study of social media and networks concluded the following: “[C]onsidering nonhumans as actors that have agency, and that can transform situations, because of ANT, we can also partially ascribe authority, accountability, and morality to these actors” (Waldherr et al., 2019, p. 3962). Nonhumans can cause harm and create ethical dilemmas; therefore, they share the blame with other agents in the network of decisions and actors. In what way they could be held liable is the most important lingering questions after that, however.

**Studies often based on fault and blame in material and practical implications that result from human and non-human action (n=524).** In a study about surveillance sensors, researchers concluded that a “materialist understanding of digital surveillance...enables new perspectives on how human bodies, subjectivities, and intentions are moulded and formed in complex sociotechnical systems” (Pötzsch, 2017, p. 14). Actor network activity can never escape ethical judgement because the consequences of human and nonhuman actions are material; they impact bodies and people's lives. **By extension, the interaction between human and nonhuman agents also changes the value of bodies (n=105).** They can exist in material and digital forms. A study of information systems called for imagining “a moral context from signs that evoke our memories of embodied experience or through embodied experiences that are calculated and inscribed in our bodies as cybernetic artifacts” (Buzato, 2017, par. 69). Not only do nonhuman agents impact our world, but we also impact their cybernetic one. The interplay may imply ethical responsibilities humans have to nonhumans, not just vice versa.

The multiple positions give pause. **Questions lingered in the literature about how to proceed in terms of an ethical framework (n=84).** A few studies outright asked rhetorical questions instead of providing rules or heuristics for ethical behavior in an actor network. For example, one study of social bots asked, “A crucial question thus emerges: Who, in the future, should control bots? Should users let corporations keep a

leash on their digital companions, or should users prioritize open-source platforms for bot design, free from conflicts of interest? This is one of many questions that Internet ethicists will face in the future and for which a hybrid ecological approach will be essential” (Guilbeault, 2016, p. 11). Some studies proposed cases and models. **They used cases as a springboard for more inquiries (n=87). Studies also suggested that more training and education in applied ethics can help answer lingering questions (n=19).** Take, for example, this recommendation from a study on racist algorithms: “This again argues for the relevance of algorithmic skills that allow a facility with the relevant ideas in math and computer science as well as the education of computing professionals in social science and ethics” (Sandvig, 2016, p. 15). Applied ethics are important, and the recommendation is valid. However, it would help to have a foundation of heuristics or framework to start and from which to build comprehensive applied ethical theory.

Case studies can help communicators sort out ethical valences in actor networks because cases are excellent illustrations of the challenges articulating ANT ethics. For example, self-driving cars are a practical object lesson for ANT analysis because they are a product of multilayered mediations and transactions between human and non-human agents. The algorithms, sensors, and non-human equipment, hardware, and software have an agency equal to human drivers and human judgment. For the sake of this analysis, questions linger as to liability and responsibility should accidents occur. Algorithms would calculate the least and greatest probability of benefit and harm (including self-sacrifice). It runs the risk of complicating (or oversimplifying) for insurers notions of ownership, fault, and risk.

## Conclusions

Rhetorical criticism and ethical analyses of key technological, scientific, and medical events or transformations result in causal pronouncements rather than prescriptions or recommendations. But these events and transformations so often manifest or result in material and social consequences that elicit angst or reluctance to abandon questions of morality and ethics altogether. Technical, scientific, and medical communication have histories steeped in humanistic calls to make a turn toward social justice and bend our criticism toward equanimity. Perhaps these are lingering remnants or ghosts of a critical theory of the past. So often, our roles as business and technical communicators involve helping sort out and articulate

liability and responsibility around these transformations. Business and technical communication scholarship on ethical agency has privileged consequential, duty and virtue theories, thereby perhaps overstating the technical communicator’s capacity and authority to advocate and bring about ethical behavior and decision making in composition, design, and testing.

Up to this point, business ethics have covered issues in the context of accounting, management control, budgeting, and performance management (Enderic and Trapp, 2018). The field has studied how individual and organizational variables impact ethical processes, and it has made recommendations for the action stage of ethical decision-making, decision-facilitating, and decision-influencing. These studies suggest the implementation of ethical guidelines, communicating and explaining these guidelines, and facilitating whistleblowing; or by installing ombudsmen. They have warned that ethical challenges can arise from management decisions such as budget rigidity or high target levels that might degrade morale and honesty. They have shown that organizational climate can motivate employees to behave ethically. In the healthcare industry, business ethics have shifted from themes of morality to those of corruption, as well as toward themes of corporate social responsibility, glass ceiling, gender equality, and corporate citizenship are gaining popularity, especially in HCM literature (Ocak, Köseoglu, & Yildiz 2017). These studies have called for more research on white-collar crime, insider trading, environmental issues, corporate citizenship, reputation management, and social responsiveness.

This study extends this work by investigating how adding nonhuman agents in the mix complicates how we evaluate ethical dilemmas and what we recommend about addressing them. Processes are impacted not only by people but also by nonhuman agents such as cars and robots running on artificial intelligence and algorithms used to analyze data for making decisions. In terms of advocating for ethical actor networks, guidelines for programming and product development are as necessary as policies for regulating human behavior. Furthermore, organizational behavior and values are but one of the multiple nonhuman agents for investigation in ethical inquiry; the technology used by organizations is also complicit in ethical problems and necessary to factor into ethical solutions.

Post-critique might seem disinterested in or ill-equipped for ethical and moral valuation and action. Foucault’s approach might exhibit a laissez-faire attitude about making moral judgments on the ideologies and regimes to power it reveals. His ethics received criticism



for radical individualism to the point where social mores recede, and social taboos such as sex between adults and children could have legitimacy. Still, as stated earlier, ANT need not preclude ethical frameworks other than utilitarian consequentialism or biological determinism where evolution rules out the possibility of acting freely or assessing blame (Liebert and Schmidt, 2010; Davies, 2009). Perhaps evaluating these cases using consequentialist instrumentalism or non teleological virtue provides sufficient ethical grounds upon which scholars can pivot to take positions on disparity, disenfranchisement, and social justice. What new arguments might these theories afford our criticism or, at least, the conclusions we draw? The following concepts map out the beginning of a framework:

- **Deliberate contextualism:** Professional communicators can help developers and programmers make explicit and transparent the moral judgment we manifest in the histories and stories we tell, and agents we assemble to map the activity networks. Ethnographic research methods can help expose unstated assumptions in the design process.
- **Ecosocial or ecosystemic judgment:** We can help developers interrogate what points of mediation and transformation in the network prevented the evolution or mutation of the network toward empathy, justice, and better angels. Here, business and professional communicators can use process audits and other systems analyses.
- **Resistance to determinism and egoism:** We must work to avoid and resist laissez faire attitude about the inevitability of bad action or social harm, exposing working or dynamics of agency, the harms created, and the responsibility and necessity of corrective. Historical analyses and case studies can help raise awareness, even when comparing new products with past and competing products.
- **Mapping complicity:** Sans strict consequentialism, the moral notion of moral complicity (decoupled from intentionality but rather the production of harm) casts a wider net than the legal notion (linked to intentionality). Skirting the boundaries of legal complicity still may well qualify as complicity on moral grounds (Mellema, 2011). Human and non-human agents, the transactions between them, need not have the intention to

qualify as complicit morally. Legal and, perhaps to a lesser extent, moral complicity can be understood as shared between human and non-human agents insofar as those relationships and the agency (power to act) between them is implemented and shared by command, counsel, consent, receiving, participating, silencing, failing to prevent and failing to denounce (where flattery or silence can be interpreted as encouragement, condoning, or covering for another after the fact). Tracking where decisions were made and implemented between human and nonhuman agents within a network of activity can help expose complicity throughout a system.

Table 4 provides examples of implementations of each bullet point above to depict their implications better. The examples provided are but a few methods that business and technical communicators can use before, during, and after product development and launch to make more transparent the interaction between human and nonhuman agents in ethical dimensions of products and services.

**Table 4.** Implementation of Correctives

Concept / Recommendation	Definition	Example
Deliberate contextualism	Help developers and programmers make explicit and transparent the moral judgment manifest in design, and agents we assemble to map the activity networks.	Conduct ethical review during development. Enlist customers and users to talk about how products reflect or disregard their values.

Ecosocial or ecosystemic judgment	Interrogate which parts of the network prevented the evolution or mutation of the network toward empathy, justice, and better angels.	Designers or communicators analyze notes and comments to conduct an audit of assumptions in the product.
Resistance to determinism and egoism	Avoid and resist laissez faire attitude about the inevitability of bad action or social harm, exposing the working or dynamics of agency, the harms created, and the responsibility and necessity of corrective.	Conduct comparison analyses between product versions and other products notorious for unethical controversies.
Mapping complicity	Tracking where decisions were made and implemented between human and nonhuman agents within a network of activity can help expose complicity throughout a system. Human and non-human agents, the transactions between them,	Perform market analysis of competing products to expose ethical problems. Perform a product postmortem analysis, including consumer feedback, of products to expose ethical problems.

	need not have the intention to qualify as complicit morally.	
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Overall, the actor-network theory empowers non-human and human agents and thereby requires reinterpreting ethics and morality. Regardless of whether ethics or morality are themselves agency—materially or symbolically, mutually or exclusively human (whether bestowed or endowed by nature or others)—agency begs moral and ethical consideration because consequences or outcomes of those actions impact individuals, families, and communities. So long as humans are acting or facing consequences of actions, it is beholden on developers, programmers, and the professional communicators who serve as representatives of users and customers to consider the unintended consequences and externalities associated with the actions of humans and nonhumans and natural and artificial intelligence. This study was limited insofar as it deliberately excluded some genres of study to focus on peer-reviewed articles. However, the focus does not degrade or invalidate the findings, given the comprehensive nature of the search. The study also revealed that actor network studies in our field often exclude a sustained interrogation of the ethical implications therein. Future studies involving actor network theory should provide ethical analyses and recommendations for practical implications.

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