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Web 3.0: Are We Building a True Consensual Internet or Yet Another Strategic Platform?

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Abstract

This study employs Habermas' theory of communicative action to scrutinize the behavior of web service providers (WSPs) in both Web 2.0 and Web 3.0. In the first phase, we uncover the strategic nature of Web 2.0 WSPs. In the context of Web 3.0, we discern a shift towards a consensual, decentralized paradigm, with Web 3.0 WSPs predominantly facilitating participation and consensus-building. Acknowledging that Web 3.0 is in its infancy with a smaller user base compared to Web 2.0, we have applied Web 3.0 principles to derive our insights, offering an initial exploration into the intentions of Web 3.0 WSPs. While recognizing the study's limitations, including the nascent stage of Web 3.0, this research lays the groundwork for understanding the evolving landscape of Web 3.0. This pioneering investigation, guided by Habermas' communicative action theory, is poised to be a valuable resource for comprehending the dynamic terrain of Web 3.0.

Keywords: Web 3.0, decentralization, Habermas, communicative action, consensus

Introduction

Web technology has evolved significantly since its inception. Originally designed for information retrieval, it has transformed into a platform for broadcasting, sharing information, and facilitating global interactions (Leiner et al., 1997). The internet's beginnings can be traced back to ARPANET, initially a network serving the US Department of Defense's DARPA, which expanded to connect various networks and became publicly accessible in 1983. The modern internet still adheres to ARPANET's open-architecture networking concept (Leiner et al., 1997). The first generation, Web 1.0, aimed to provide information to users through static servers. It was essentially a "read-only" format where content creators shared information with the audience. With the advent of Web 2.0, the internet entered a new era characterized by increased user interaction. Web 2.0 introduced the concept of "pro-sumption," where users both consumed and produced content, fostering a participatory and social web (Leiner et al., 1997). However, this shift also led to concerns about user privacy, anonymity, and data security, as Trusted Third Parties (TTPs) assumed control over access and data, mediating communication between internet users.

Advocates of the future Internet referred to as Web 3.0 or web3, attack several of these drawbacks of Web 2.0 systems by targeting the idea of a trusted intermediary and ownership of the data. Several definitions and conceptualizations of Web 3.0 exist due to its vagueness and infancy. However, the most important objective of web 3.0 is to decentralize the power possessed by the TTP to enforce "trustlessness." This means that users participating in the Web 3.0 Internet do not have to depend on the central TTP to interact with other participants through peer-to-peer communication.

Removing the TTP from the scene requires decentralization of data and authority. This is achieved through a distributed network where participating users are required to contribute to the larger network by sharing their storage and computing power quantum. Data generated by an individual is stored across the devices participating on the Web 3.0 Internet. Consequentially, the problem of a single point of failure is effectively

eliminated, i.e., even if one of the participating devices is offline, the requested resource should still be accessible from the other participating devices.

With the lack of a TTP, Web 3.0 uses consensus mechanisms to enable coordination and facilitate the users of Web 3.0 to reach an agreement on the global truth. Unlike Web 2.0 platforms, where the TTP validates the truth to arrive at a consensus, the consensus process is much more difficult in a decentralized environment as more than one entity on the Internet now participates in the validation of the global truth. These consensus mechanisms ensure that no single participating device (or entity) has the power to modify the data or manage access control.

Organizations are operating web services on the principles and technologies of Web 2.0 with a strategic goal (Urban et al., 2000). Businesses have leveraged Web 2.0 to increase their customer base and market footprint (Whitacre and Brooks, 2009). They exercise tremendous power over data and access control on their servers. Web 3.0 tries to emancipate Internet users from the powers and risks associated with Web 2.0 technologies and services by constructing a consensual Internet through the decentralization of data and authority. But how consensual is it? In this study, we try to analyze the actions of organizations (or web service providers) across the two generations of the Internet using Habermas' theory of communicative action. This is a two-step study where we first try to establish the strategic nature of Web 2.0, followed by an analysis to verify the consensual nature of Web 3.0 through the actions of the service providers on both the web generations.

The paper proceeds as follows: we begin by providing an overview of communicative action theory and its relevance to this study. Next, we explore the actions carried out by web service providers in the contexts of both Web 2.0 and Web 3.0. Finally, we delve into the analysis findings and offer concluding remarks.

Habermas' Theory of Communicative Action

This study uses the theory of communicative action by Jurgen Habermas (Habermas, 1979; Habermas, 1985; Habermas, 2003). Habermas' theory is one of the most prominently used theories in IS research (Maail et al., 2010; Willcocks and Mingers, 2004) and has had a greater impact on the IS discipline than any other work from the critical social theory (CST) school of thought (Ngwenyama and Lee, 1997). IS scholars have used the theory of communicative action (TCA) to discuss the critical paradigm in IS research in addition to the prevailing positivist and interpretive paradigm (Ngwenyama and Lee, 1997; Orlikowski and Robey, 1991; Orlikowski and Baroudi, 1991). By embracing Habermas' framework, this study will cumulatively add to the knowledge that has already gained recognition among IS scholars. (Ngwenyama and Lee, 1997).

Habermas' theory of communicative action posits that social actions rely on a fundamental set of norms, encompassing an individual's right to express opinions and their obligation to accept rational arguments (Habermas, 1985; Ngwenyama and Lee, 1997). These actions entail specific validity claims, which individuals must defend. A breakdown occurs when social norms are violated or misunderstandings arise (Ngwenyama and Lee, 1997). In such cases, individuals can engage in critical reflection, drawing from their knowledge of the social context, the action itself, and the people involved. If consensus isn't reached, a discourse or open debate with other parties can be initiated to evaluate the action's validity claims, ultimately striving for the "ideal speech situation" (Habermas, 1985).

The ideal speech situation necessitates four validated claims for an action: truth, sincerity, comprehensibility, and legitimacy (Cukier et al., 2004; Habermas, 1979; Habermas, 1985). Truth relates to factual accuracy, while sincerity concerns intentions matching an actor's agenda. Comprehensibility denotes a shared understanding, and legitimacy focuses on adherence to social norms and appropriateness within the context (Cukier et al., 2004; Ngwenyama and Lee, 1997).

Habermas describes four types of social action that describe human behavior in social settings: instrumental, communicative, discursive, and strategic. Instrumental action refers to behavior that is aligned with accomplishing rational objectives where the actor executing the social action views the other actors as mere objects or organizational resources. When executing an instrumental action, the executing actor may manipulate the other actors to attain the objective. This may also involve the use of power to obtain compliance if it is contextually appropriate. Individuals subject to instrumental action need to critically reflect on its legitimacy to evaluate the validity of the action.

An actor executes a communicative action to establish a mutual understanding with the other participating actors. This requires the participating actors to mutually inform the other actors about the action and the knowledge required to comprehend the action. By its very nature, communicative action assumes the participating individuals as actors capable of intelligent thinking, unlike instrumental action, which assumes the individuals to be mere objects. When an individual subject to communicative action is unable to arrive at a consensus with the social actor exercising the communicative action, one is required to critically reflect on the truth, comprehensibility, and legitimacy of the action.

A discursive action is executed when a breakdown, i.e., violation of the validity claims, occurs to restore the consensus and to reestablish the validity claims. It may also be executed when a joint consensus needs to be made by all the participating actors on social action. When the validity claims of a social actor's action are questioned, a discursive action is executed through critical debate and argumentation with the aim of restoring the validity claim of the action performed. The actor performing a discursive action needs to evaluate the comprehensibility and legitimacy of the action along with the truthfulness and sincerity claims when required (Ngwenyama and Lee, 1997).

Strategic action is performed when a social actor intends to achieve a rational objective by transforming the behavior of the other actors in the social context. Though it intends to achieve a rational objective like instrumental action, strategic action assumes the opponent is an intelligent actor and not a mere social object. A strategic action may be conducted openly or covertly, and the actor may use both personal and organizational resources to manipulate the other social actors and rules to achieve the objective. The actor subject to a strategic action needs to evaluate the legitimacy of the action in the given social context. The actor can be performing "dirty tricks" when one fails to establish the legitimacy of his action (Ngwenyama and Lee, 1997). The types of social actions along with their validity claims have been summarized in the table below.

Social action	Validity claims			
	Truth	Sincerity	Comprehensibility	Legitimacy
Instrumental				✓
Communicative	✓		✓	✓
Discursive	✓	✓	✓	✓
Strategic				✓

Table 1. Types of social action and their applicable validity claims

Examining the Internet from the TCA Perspective

We argue that the theory of communicative action is apt to analyze the objectives of web service providers and the purposes of web services for the following reasons. The Internet we have today is significantly different from ARPANET. Web 2.0 transformed how people use the Internet, evolving it into a socio-technical structure that allows participating users to interact and collaborate with each other (Walsh, 2017). The Internet no longer consists of mere infrastructure and protocols but also social entities that enliven the Internet. There is a presence of a symbiotic relationship between the users (actors) participating on the Internet and the Internet itself: actors or actor groups are affecting discourses on the Internet (AlDayel and Magdy, 2021) and the Internet is affecting the actors at an individual level (Anderson et al., 2017) or a societal level (Castells et al., 2004).

Habermas' contention is that communicative action is governed by binding consensual norms that define reciprocal expectations about behaviour, which must be understood and recognized by at least two acting subjects. Unconstrained intersubjectivity is thus posited to be at the heart of human communication. It is "grounded only in the intersubjectivity of the mutual understanding of intentions and secured by the general recognition of obligations" (Habermas, 2016). Given the growing intersubjectivity in the use of the web, this calls for a re-look at the reciprocal expectations and obligations of both the provider and the user. The underlying philosophy of this framework privileges inter-subjective relation between actors, attained

through mutual understanding. The trajectory of the Internet, and the claims made by Web 3.0 thus makes this framework an appropriate one to validate these.

Presently, the participatory nature of the Internet is facilitated by TTPs (Naz et al., 2019) that operate services on the Internet. There is an existence of power structures due to the presence of TTPs. The TTPs facilitate interactions between the participating actors, own the data of the actors stored on their machines, and moderate the access control of the actors, i.e., decide who gets to "see what" and "do what" on the Internet. This power imbalance often raises questions about the validity of the actions executed by the TTPs on the Internet. The involvement of a TTP creates a lack of trust and transparency and poses security risks to the data stored on the TTP's infrastructure (Naz et al., 2019). However, the same TTP moderates the interactions between the participating actors on the Internet and helps achieve a consensus between them. Advocates of Web 3.0 warrant the decentralization of data and power from the TTPs and introduce consensus protocols to involve all participating actors in the decision-making process. Such emancipatory actions have been defined by the ideal speech situation in the theory of communicative action.

Given these differing claims (and aims) of Web 2.0 and 3.0, Habermas' theory of communicative action gives the most cogent framework, especially, for distinguishing between purposive-rational or instrumental and communicative action. Habermas recognizes that rarely do the conditions of actual communication meet up to the ideal of his 'communicative rationality.' Historically, the organization of social relations has reflected institutionalized power relations, rather than a communication free from domination (d'Entrèves et al., 1997). Ideal communication should aim at an understanding, that is tied to the idea of reaching an agreement. Understanding is not just passing off the meaning from the speaker to the listener, because meaning goes beyond the speaker's intention. It calls for a reciprocal openness to challenge and critique and a reflective attitude both on the part of the speaker and hearers, thereby making it risky and inefficient. Communication often slides into being strategic, where the intent is not to reach an agreement but to effectively carry out one party's plans. This fundamental Habermasian intuition is invaluable in assessing the legitimacy of the claims, objectives and intents made by the two succeeding generations of the Web.

Web 2.0: Objectives and Intents

The term Web 2.0 was coined by Tim O'Reilly (2005) to refer to the transition of the Internet to a new phase of use and development of services (Dwivedi et al., 2011; Harrison and Barthel, 2009). O'Reilly (2007) describes Web 2.0 as a set of principles and practices that connect websites or services that follow similar principles summarized below.

P1. *Web as a platform* – emphasis on delivering scalable services rather than packaged software products.
P2. *Harnessing collective intelligence* – users get better experiences and benefit from the Internet as more people use the services.
P3. *Ownership of data* – control over public and proprietary databases can lead to control over the market.
P4. *Continuous deployments over release cycles* – constantly updating the service experiences with new features and information to deliver contemporary services.
P5. *Service inter-compatibility* – building open services that are inter-compatible or play well with other software.
P6. *Multi-device experiences* – building services that can run on multiple devices with different form factors.
P7. *Rich user experiences* – building applications and services that can harness the potential of the Internet to the fullest to enable maximum interaction and collaboration between the users participating on the Internet.

These principles emphasize flexible access, multimedia capability, multi-user participation and interaction, informality, and feedback. (Dwivedi et al., 2011; Abbot, 2010). Based on these seven principles of Web 2.0, we search for evidence in literature that describes social actions that translate these principles into executables in practical applications. The actions identified through this exercise are not exhaustive, though we are convinced that they cover the significant practices in existence now.

Web service providers (WSPs) function as Trusted Third Parties (TTPs), wielding control over data and access. They seamlessly integrate various web services via hyperlinks on their websites, delivering unified webpages to users (O'Reilly, 2007). This technique enables them to offer diverse content from various sources, whether within the same WSP (e.g., Wikipedia) or different ones (e.g., Google News), enhancing visibility and promoting complementary services (Gorbunova, 2017; Niemisto, 2012). By redirecting users to other WSPs through hyperlinks, WSPs focus on their expertise while earning commissions for referrals (Zhang et al., 2021; Chai et al., 2007). They may also host hyperlinked advertisements and engage in syndication to increase visibility and potential earnings (Clarke, 2008).

A key principle of Web 2.0 is encouraging user collaboration and engagement (O'Reilly, 2007). WSPs actively promote user-generated content. For instance, marketplaces like Amazon encourage customers to review products, benefiting potential buyers (O'Reilly, 2007). Social media platforms promote user pro-sumption, fostering both content creation and consumption. Wikipedia allows any internet user to edit and add information, incentivizing user-generated content that keeps platforms dynamic and engaging (Fallis, 2008).

WSPs heavily rely on algorithmic data processing to manage user-generated data (O'Reilly, 2007). These algorithms extract value from user-generated content and enhance the overall user experience. Through self-service agreements, WSPs expand their user base and claim ownership of user-generated data, tapping into the collective intelligence of their users (O'Reilly, 2007). However, they may deny access to their services if users refuse to agree to terms and conditions related to data processing and aggregation (Hartzog, 2010). Users typically consent, sometimes reluctantly, due to a lack of alternatives, highlighting the instrumental approach of WSPs that leverages user consent (O'Reilly, 2007).

Internet moderation encompasses instrumental and discursive approaches (Einwiller and Kim, 2020). The former includes filtering unwanted content and misinformation, upholding truth and sincerity claims while challenging comprehensibility. Deliberate suppression of information, though potentially morally questionable, remains legitimate under user consent, constituting instrumental moderation. Systematic consensus-seeking, such as challenging information legitimacy, is a discursive approach, encompassing validity claims.

Action	**Underlying principle**	**T**	**S**	**C**	**L**	**Nature of action**
hyperlinking other web services	P1				✓	Strategic
syndicating with other web services	P1				✓	Strategic
aggregating data from multiple web services	P1, P2				✓	Strategic
updating services constantly	P1, P2, P4, P7				✓	Strategic
adopting multi-device methodologies	P1, P5, P6, P7				✓	Strategic
advertising on web services	P1, P7				✓	Strategic
encouraging content generation	P2, P3, P7				✓	Strategic
algorithmic processing and aggregation of user data	P2, P3, P7				✓	Instrumental
treating users as co-developers	P2, P4, P7	✓	✓	✓	✓	Discursive
moderating through direct censorship	P3, P7				✓	Instrumental
moderating through consensus	P3, P7	✓	✓	✓	✓	Discursive
developing proprietary standards	P5, P6				✓	Strategic

Table 2. Actions performed by Web 2.0 WSPs and their nature
(T=Truth, S=Sincerity, C=Comprehensibility, L=Legitimacy)

Cross-platform development techniques (O'Reilly, 2007) benefit web service providers (WSPs) by reaching diverse devices, enhancing user retention. Involving users as "co-developers," granting early access, and receiving feedback maintains truth, sincerity, and legitimacy. Comprehensibility varies depending on users' understanding of beta software risks. Treating users as co-developers is a discursive approach. Contrastingly, some WSPs opt for proprietary standards, rejecting open ones (Eisenmann, 2008). This

choice compromises compatibility and interoperability, lacking truth, sincerity, and comprehensibility, potentially seen as a user retention "dirty trick."

WSPs constantly strive to keep the contents offered in their services to be relevant and up to date. This requires a constant effort from the service providers to actively monitor usage patterns of their services to determine the relevant set of features to be added. Service providers also constantly monitor the features offered by their competitors to stay relevant and look for shifts in discourses. The act of monitoring and constantly updating is done strategically to stay on top of the game.

Web 3.0: Objectives and Intents

Web 3.0 is a nascent term. The word "Web 3.0" was coined by Gavin Wood – one of the co-founders of Ethereum – in 2014, shortly after the launch of their blockchain (Ethereum, n.d.). Wood referred to Web 3.0 as a "decentralized online ecosystem based on blockchain" (Edelman, 2021). Web 3.0 represents a new direction for web apps with a shift in focus from "centrally owned and managed applications" to "applications built on decentralized protocols" (Antonopoulos and Wood, 2018). Ethereum (n.d.) and the Web 3.0 Foundation (n.d.) mention the following as the core principles of Web 3.0.

P1. *Decentralization* – ownership of the Internet is distributed among the web service providers and the users.
P2. *Permissionlessness* – every participating user on the Internet gets equal access to a web service.
P3. *Native payments* – replacing existing bank infrastructure and payment gateways in favor of cryptocurrency payments.
P4. *Trustlessness* – replacing trusted third parties in favor of incentives and economic mechanisms.

We're continuing our exploration of social actions that align with Web 3.0 principles. In Web 3.0, Web Service Providers (WSPs) still exist but no longer serve as Trusted Third Parties (TTPs). Data decentralization is achieved through distributed file systems (Benet, 2014) and blockchains (Buterin, 2014) that store data across the Web 3.0 ecosystem. The software supporting this data infrastructure is open sourced for public code audit and reuse. Blockchains and distributed file systems ensure data replication across multiple devices in the network, addressing the issues of data centralization and single points of failure. To maintain data integrity, any changes made on one device must be reflected on others to establish truth. This process relies on consensus mechanisms to challenge modifications. Decentralizing data fulfills validity claims and can be seen as a discursive action.

WSPs achieve decentralization of power and authority using consensus mechanisms (Mingxiao et al., 2017; Wang et al., 2019; Lashkari and Musilek, 2021). Web 3.0 makes use of consensus protocols or algorithms to verify the transactions on the blockchain (Nakamoto, 2008; Buterin, 2014) and maintain the integrity of the data stored on the blockchain. This also means that a central access control system is absent. WSPs effectively have no say in who gets to use which web service unless the user has been blacklisted from executing transactions on the chain by several trusted authorities (Zhang et al., 2019). The participatory nature required by the consensus algorithms involves challenging the action with the aim of restoring the four validity claims. Therefore, decentralization of power can be categorized as a discursive action.

Given the innate technological complexity and the newness of Web 3.0 technologies, it is difficult for WSPs to develop web services (Liu, 2018) that are user-friendly in nature. The Web 3.0 ecosystem involves multiple complex algorithms, which are difficult to abstract with the web service built on top of it (Baur et al., 2015). The ease of use is extremely low of Web 3.0 services and requires the users to perform multiple steps to execute a transaction on the service (Ramadhan and Iqbal, 2018). WSPs and Web 3.0 infrastructure developers have been taking steps to improve blockchain literacy among users to help them overcome the learning curve involved. The facts about the system are stated to the user for him to comprehend the technology. There is a clear visibility of communicative behavior in this action.

Performing any transaction on the Web 3.0 Internet requires cryptocurrency. Executing a transaction on a blockchain requires using the cryptocurrency native to that chain (for example, ether (ETH) is the native currency of Ethereum). WSPs and crypto traders constantly push users to exchange fiat currency for cryptocurrency to use Web 3.0 services. Users willing to use Web 3.0 services do not have an alternative other than purchasing cryptocurrency with fiat money. Given the current state of awareness on blockchain and cryptocurrency, users turn docile and accept cryptocurrency to get on board the Web 3.0 ecosystem.

There is an apparent lack of truth, sincerity, and comprehensibility in this action, suggesting an instrumental nature. The results of the analysis are summarized in the table below.

Action	**Underlying principle**	**T**	**S**	**C**	**L**	**Nature of action**
decentralizing data storage	P1, P4	✓	✓	✓	✓	Discursive
decentralizing authority	P2, P4	✓	✓	✓	✓	Discursive
improving Web 3.0 literacy among users	P1, P2	✓		✓	✓	Communicative
pushing for the adoption of cryptocurrency	P3, P4				✓	Instrumental

Table 3. Actions performed by Web 3.0 WSPs and their nature
(T=Truth, S=Sincerity, C=Comprehensibility, L=Legitimacy)

Discussion, Conclusion, and Future Steps

The analysis of Web 2.0 WSPs reveals that 8 out of 12 social actions have a strategic nature, with an additional 2 having an instrumental nature. Despite the emphasis on user participation and interaction in Web 2.0, these WSPs excel in leveraging user trust. Organizations are striving to establish trust-based strategies to enhance customer relationships and profitability (Urban et al., 2000). This entails building trust in their websites, the displayed information, and service delivery, achievable through the actions discussed in this study.

Web 3.0, on the other hand, maintains participatory aspects of Web 2.0 but eliminates centralization. Analysis of Web 3.0 WSP actions uncovers 2 discursive and 1 communicative action out of 4. While not entirely discursive, these results strongly suggest a participatory, consensual nature. Consensus algorithms enable users to evaluate local truths based on reason and evidence, facilitating a rational global consensus. Web 3.0 is designed to foster participation and consensus-building, making it a truly participatory and consensual web.

This study has limitations due to the early stage of Web 3.0, which has a small user base compared to Web 2.0. This makes it challenging to identify actions by Web 3.0 service providers (WSPs). Our extensive experience with Web 2.0 and limited exposure to Web 3.0 may introduce biases in our findings. However, we've applied Web 3.0 principles to identify actions, validating our results. As Web 3.0 matures and accrues a more discernible set of actions, future research endeavors should revisit this terrain, offering fresh insights into this evolving landscape. Notably, this study marks the inaugural exploration into the intentions of Web 3.0 WSPs, employing Habermas' theory of communicative action as a guiding framework. Its findings are poised to become an invaluable resource for the dynamic terrain of Web 3.0.

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