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Reimagining Social Media Through Middleware: A Structural Path to Competition and User Agency

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Most regulatory proposals for social media reform aim to mitigate platforms' harmful effects without changing their underlying structure. Middleware, by contrast, is a structural solution that aims to create a new competitive layer between dominant internet platforms and consumers. In the context of social media, middleware adoption would mean replacing a platform's single proprietary recommender algorithm with a marketplace of algorithms, giving users greater control over how their feed is filtered, curated, and ranked. Middleware could give users greater agency and reduce the disproportionate power social media platforms have over consumers, creators, and third-party businesses and apps.

This Article contributes to the discussion about middleware by identifying the regulatory prerequisites for its success. It argues that to prevent the middleware layer from collapsing back into old patterns of consolidation and unequal power distribution, its introduction must be accompanied by specific structural regulation. Social media platforms must be (1) compelled to provide mandatory and uniform access to application programming interfaces ("APIs") and (2) prohibited from offering their own recommender algorithms

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(i.e., structural separation). The Article also analyzes the risk of middleware consolidation and its privacy implications.

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I. Introduction

The harmful effects of social media—dilution of privacy, increased ad burden, and commodification of attention—are becoming

increasingly recognized.[1] Most proposals for social media reform target the harmful *effects* of social media without changing the underlying *structure* of the platform. For example, content moderation and data protection rules seek to mitigate social media's harms without materially changing its underlying structure, business model, or incentives. Some structural overhauls have been proposed, like breaking up social media companies[2] or regulating them as public utilities, essential facilities, or common carriers.[3] For those who believe that social media warrants structural intervention and power redistribution, proposals for simply curtailing harms without dismantling the underlying infrastructure will seem insufficient.[4]

Against this backdrop, this Article explores one such structural solution: "middleware," advanced by Francis Fukuyama and his

1. *See generally* SHOSHANA ZUBOFF, THE AGE OF SURVEILLANCE CAPITALISM: THE FIGHT FOR A HUMAN FUTURE AT THE NEW FRONTIER OF POWER (2019); TIM WU, THE ATTENTION MERCHANTS: THE EPIC SCRAMBLE TO GET INSIDE OUR HEADS (2016).
2. ZEPHYR TEACHOUT, RECOVERING OUR FREEDOM FROM BIG AG, BIG TECH, AND BIG MONEY: BREAK 'EM UP 62 (2020); K. Sabeel Rahman, *Regulating Informational Infrastructure: Internet Platforms As The New Public Utilities*, 2 GEO. L. TECH. REV. 234, 238 (2018); Chris Hughes, *It's Time to Break Up Facebook*, N.Y. TIMES (May 9, 2019), https://www.nytimes.com/2019/05/09/opinion/sunday/chris-hughes-facebook-zuckerberg.html [https://perma.cc/3YMR-N7VN (staff-uploaded, dark archive)].
3. Rahman, *supra* note 2, at 238; K. Sabeel Rahman, *The New Utilities: Private Power, Social Infrastructure, and the Revival of the Public Utility Concept*, 39 CARDOZO L. REV. 1621, 1639–46 (2018); Nikolas Guggenberger, *The Essential Facilities Doctrine in the Digital Economy: Dispelling Persistent Myths*, 23 YALE J.L. & TECH. 301, 328–29 (2021); Ganesh Sitaraman & Morgan Ricks, *Tech Platforms and the Common Law of Carriers*, 73 DUKE L.J. 1037, 1038–40 (2024).
4. *See* Yochai Benkler, *The Role of Technology in Political Economy: Part 1, 2 & 3*, LPE PROJECT (2018), https://lpeproject.org/symposia/political-economy-of-technology/ [https://perma.cc/PU7Q-365T]; Julie Cohen, *Technology, Political Economy, and the Role(s) of Law*, LPE PROJECT (June 8, 2018), https://lpeproject.org/blog/technology-political-economy-and-the-roles-of-law/ [https://perma.cc/6JVH-JQR6]; Jack Balkin, *The Political Economy of Freedom of Speech in the Second Gilded Age*, LPE PROJECT (2018), https://lpeproject.org/blog/the-political-economy-of-freedom-of-speech-in-the-second-gilded-age/ [https://perma.cc/S9X7-ZB7H].

colleagues at Stanford.[5] Middleware aims to create a marketplace for recommender algorithms that operates on top of social media platforms.[6]

Currently, social media users are tied to a social media platform's proprietary recommender algorithm. When a user signs up for a social media platform like Facebook or TikTok, their feed is shaped by the platform's standard recommendation and ranking algorithm. This proprietary algorithm accounts for a specific set of user metrics—like location, age, gender, sexuality, and activity history—and optimizes for a fixed goal like "engagement" or "time spent."[7] Users cannot customize these metrics or choose alternative optimization goals.

Middleware proposes to remedy this by allowing third parties to provide their own recommender algorithms, which operate on top of social media platforms. Researchers and industry veterans like Jack Dorsey,[8] Stephen Wolfram,[9] Richard Reisman,[10] Francis Fukuyama,[11]

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5. Francis Fukuyama et al., *Report of the Working Group on Platform Scale*, STAN. PROGRAM ON DEMOCRACY & INTERNET 9 (Nov. 17, 2020), https://fsi9-prod.s3.us-west-1.amazonaws.com/s3fs-public/platform_scale_whitepaper_-cpc-pacs.pdf [https://perma.cc/8UED-ZUAE].

6. Fukuyama, *supra* note 5, at 30–31.

7. *See infra* Part II.

8. Mike Solana, *The End of Social Media: An Interview With Jack Dorsey*, PIRATE WIRES (May 9, 2024), https://www.piratewires.com/p/interview-with-jack-dorsey-mike-solana [https://perma.cc/DC2W-JAWZ].

9. *See Optimizing for Engagement: Understanding the Use of Persuasive Technology on Internet Platforms: Hearing Before the S. Subcomm. on Commc'ns, Tech., Innovation, & the Internet*, 116th Congress 9–10 (2019) (statement of Stephen Wolfram, Founder, Chief Executive Officer, Wolfram Research, Inc.), https://www.commerce.senate.gov/services/files/7A162A13-9F30-4F4F-89A1-91601DA485EE [https://perma.cc/3LBA-BL75].

10. Richard Reisman, *New Logics for Governing Human Discourse in the Online Era*, CTR. FOR INT'L GOVERNANCE INNOVATION 9–11 (Apr. 25, 2024), https://www.cigionline.org/static/documents/FoT_PB_no.11.pdf [https://perma.cc/VV3F-WVR4]; Richard Reisman, *How Third-Party Social Media Middleware can Protect Contextual Privacy*, TECH POL'Y PRESS (Oct. 11, 2023), https://www.techpolicy.press/how-third-party-social-media-middleware-can-protect-contextual-privacy/ [https://perma.cc/HQZ7-GWV3].

11. Fukuyama, *supra* note 5, at 9; Francis Fukuyama, *Making the Internet Safe for Democracy*, 32 J. DEMOCRACY 37, 40 (2021).

Chand Rajendra-Nicolucci, and Ethan Zuckerman[12] are advocates of middleware. Versions of this idea are also being tested in the market.[13] Bluesky, the new X competitor, has started allowing users to customize their algorithms, even offering a range of options developed by third parties.[14]

This Article analyzes the potential for middleware to act as a structural solution that remedies the problems associated with concentration. Part II provides an anatomy of social media recommender algorithms, highlighting their homogenous functioning and the lack of user control over curation and ranking functions. Part III introduces middleware as a broad-spectrum structural solution that could mitigate harms relating to content moderation, concentration, and power asymmetries, and provide additional benefits by improving transparency and explainability.

This Article builds on existing literature about middleware in three important ways.[15] First, it identifies legal and institutional preconditions to middleware's viability. It argues that middleware can deliver on its promises only if accompanied by structural regulation: (1) mandatory and uniform access to application programming interfaces ("APIs") and (2) separation of the platform layer from the recommender algorithm. Part IV discusses the use of antitrust tools and statutory mandates in implementing these preconditions.

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12. Chand Rajendra-Nicolucci et al., *The Three-Legged Stool: A Manifesto for a Smaller, Denser Internet*, INITIATIVE FOR DIGIT. PUB. INFRASTRUCTURE UMASS AMHERST (Mar. 29, 2023), https://publicinfrastructure.org/2023/03/29/the-three-legged-stool/ [https://perma.cc/AR6M-K8PY] [hereinafter Rajendra-Nicolucci et al., *Three-Legged Stool*]; Chand Rajendra-Nicolucci & Ethan Zuckerman, *A Better Approach to Privacy for Third-Party Social Media Tools*, TECH. POL'Y PRESS (Aug. 31, 2023), https://techpolicy.press/a-better-approach-to-privacy-for-third-party-social-media-tools [https://perma.cc/N52E-M87H].

13. *See infra* notes 61–64 and accompanying text.

14. Jay Garber, *Algorithmic Choice*, BLUESKY (May 30, 2023), https://bsky.social/about/blog/3-30-2023-algorithmic-choice [https://perma.cc/8UDJ-KLLT]; *Algorithmic Choice with Custom Feeds*, BLUESKY (July 27, 2023), https://bsky.social/about/blog/7-27-2023-custom-feeds.

15. *See generally* Fukuyama, *supra* note 11; Daphne Keller, *The Future of Platform Power: Making Middleware Work*, 32 J. DEMOCRACY 168 (2021).

Second, the Article in Part V responds to a common criticism of middleware: that eventually this new layer will consolidate, too. Using antitrust enforcement actions against AT&T and Microsoft as examples, this Article shows that while there may be a risk of eventual consolidation of the middleware layer, even a temporary disruption caused by the introduction of the new layer will spur innovation and push this realm into the next frontier of technology. In any event, structural separation is only the first step of a larger anti-monopoly agenda.

Third, the Article analyzes middleware's privacy implications in Part VI, building on Zuckerman and Reisman's defense by arguing that there is no substitute for passing privacy legislation and designing technical models for data sharing. Data is increasingly regarded as an asset, and the facilitation of data sharing (whether through middleware or otherwise) has become inevitable for leveling the playing field between Big Tech players and new entrants. The Article also suggests additional privacy safeguards, like licensing and auditing.

II. ANATOMY OF SOCIAL MEDIA RECOMMENDER ALGORITHMS

Early versions of social media ranked content in reverse chronological order—that is, the most recently posted content would appear first. However, as the volume of content increased, platforms became more sophisticated and decided to expose individuals to not just posts of their friends and community, but also outside content. Hence, new methods of ranking had to be developed.[16]

Today, most social media platforms rely on recommender algorithms that employ machine learning techniques.[17] While the exact contours of recommender algorithms differ across platforms and are protected proprietary information, these systems share some

16. Chris Meserole, *How Do Recommender Systems Work on Digital Platforms?*, BROOKINGS (Sept. 21, 2022), https://www.brookings.edu/articles/how-do-recommender-systems-work-on-digital-platforms-social-media-recommendation-algorithms/ [https://perma.cc/788A-T9FW].

17. Arvind Narayanan, *Understanding Social Media Recommendation Algorithms*, COLUM. UNIV.: KNIGHT FIRST AMEND. INST. (Mar. 9, 2023), https://knightcolumbia.org/content/understanding-social-media-recommendation-algorithms [https://perma.cc/AM9C-ZWR3].

common features. The following is a broad sketch of how recommender algorithms work.[18]

> **Inventory:** This consists of all available content, including posts from connections, people, and pages a user follows, recommended ads, and even content that the user might not have subscribed to but seems relevant based on the user's past activities and interests.[19]
>
> **Integrity Check:** The inventory is scanned for content that violates the platform's community standards.[20] At this stage, content might be altogether removed or demoted, depending on whether it is a clear violation or a "borderline" case.[21]
>
> **Candidate Generation:** The inventory is huge (even after the integrity check) and not all of it can be displayed. Candidate generation allows platforms to narrow down millions of posts to a representative few hundred.[22] Narrowing is done using metrics like type of content (for example, to display a mix of photo, video and text content), geography, user's personal

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18. Constanza M. Vidal Bustamante, *Social Media Recommendation Algorithms*, BELFER CTR. SCI. & INT'L AFFS. 6–9 (Aug. 2022), https://www.belfercenter.org/sites/default/files/pantheon_files/files/publication/Social%20Media%20Recommendation%20Algorithms%20Tech%20Primer.pdf [https://perma.cc/68UJ-DUSN].

19. *Our Approach to Facebook Feed Ranking*, META: TRANSPARENCY CTR. (June 29, 2023), https://transparency.meta.com/en-gb/features/ranking-and-content/ [https://perma.cc/N7J9-HDXY].

20. Tessa Lyons, *The Three-Part Recipe for Cleaning up Your News Feed*, META (May 22, 2018), https://about.fb.com/news/2018/05/inside-feed-reduce-remove-inform/ [https://perma.cc/P97Y-SD7R].

21. *Types of Content that We Demote*, META: TRANSPARENCY CTR. (Oct. 16, 2023), https://transparency.meta.com/en-gb/features/approach-to-ranking/types-of-content-we-demote/ [https://perma.cc/C44J-J69A].

22. *Twitter's Recommendation Algorithm*, X: ENG'G (Mar. 31, 2023), https://blog.x.com/engineering/en_us/topics/open-source/2023/twitter-recommendation-algorithm# [https://perma.cc/R4FQ-W4T2].

> attributes (demographics, gender, age, etc.), past user activity, and expressed and inferred interests.[23]
>
> **Ranking:** These narrowed-down candidates then receive scores based on the value or goal the social media platform is optimizing for. For example, the platform could optimize for predicted user engagement, relevance, time spent, or any other goal.[24] The scores are based on many of the same metrics enumerated above and are used to finally rank content.

There are several unknowns in this process. What values or goals is the recommender algorithm maximizing—that is, what is the content being scored for (relevance, time spent, engagement, etc.)? What specific metrics and data points are accounted for in giving a post its score (gender, sexuality, age, race, etc.)? What weight is attached to each of these metrics? Users get some information about these factors. For example, users know that Facebook has altered the goals of its recommender algorithm over the years.[25] Users also know the broad range of metrics relied on for determining the "score" of a post on Facebook, though the exact metrics and weights used for calculating the score are unknown.[26] Given the black box nature of machine-learning techniques that power recommender algorithms, much of this triad—values, metrics, and weight—remains both unknown and outside users' control.

A. Homogeneity of Recommender Algorithms

Although a user's *feed* is customized based on their individual and group attributes and past activity, the same proprietary *algorithm* applies to everyone. Facebook's ranking algorithm, for example, is the same for all users. Users have very little control over the triad of values, metrics, and weight that shapes their feed. For example, users have no

23. *Our Approach to Facebook Feed Ranking*, *supra* note 19.

24. *Id.*

25. Will Oremus, Chris Alcantara, Jeremy B. Merrill & Artur Galocha, *How Facebook Shapes Your Feed*, WASH. POST (Oct. 26, 2021, 7:00 AM), https://www.washingtonpost.com/technology/interactive/2021/how-facebook-algorithm-works/ [https://perma.cc/XKZ8-J7W7 (staff-uploaded, dark archive)].

26. *Our Approach to Facebook Feed Ranking*, *supra* note 19.

control over (or even awareness of) Facebook's use of demographic attributes like race, ethnicity, gender, and sexual orientation.[27] Reliance upon such attributes for targeting content has been shown to harm certain demographic groups, especially in the contexts of housing, employment, and credit.[28]

On the other hand, some LGBTQ+ teenagers have reported that the inclusion of their demographic attributes (like sexuality) in recommendation decisions has helped them access relevant information and overcome feelings of isolation by connecting with a larger community that shares their experiences.[29] Hence, it is difficult to simply classify metrics (even demographic ones) as harmful or benign; their acceptability depends on individual context and preferences. Under platforms' proprietary recommender algorithms, individuals or groups have no control over the inclusion of these demographic attributes or their proxies in recommendation decisions.[30]

Similarly, recommender algorithms optimize for the same value across the entire user base. Most recommender algorithms produce a score for engagement. However, engagement might not always be the appropriate metric for content curation and ranking and could result in the proliferation of harmful content.[31] Alternative optimization metrics are both desirable and possible.[32] For example, in 2017,

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27. Jinyan Zang, *Solving the Problem of Racially Discriminatory Advertising on Facebook*, BROOKINGS (Oct. 19, 2021), https://www.brookings.edu/articles/solving-the-problem-of-racially-discriminatory-advertising-on-facebook/ [https://perma.cc/WD96-2DSZ].

28. *Id.*

29. Claire Cain Miller, *For One Group of Teenagers, Social Media Seems a Clear Net Benefit*, N.Y. TIMES (May 24, 2023), https://www.nytimes.com/2023/05/24/upshot/social-media-lgbtq-benefits.html [https://perma.cc/NR2S-BZUW (staff-uploaded, dark archive)].

30. Zang, *supra* note 27.

31. Jonathan Stray, *Beyond Engagement: Aligning Algorithmic Recommendations with Prosocial Goals*, P'SHIP AI (Jan. 21, 2021), https://partnershiponai.org/beyond-engagement-aligning-algorithmic-recommendations-with-prosocial-goals/ [https://perma.cc/9JTG-64RF].

32. Alex Moehring et al., *Better Feeds: Algorithms That Put People First*, KNIGHT–GEORGETOWN INST. (Mar. 4, 2025), https://kgi.georgetown.edu/wp-

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Facebook incorporated "meaningful social interactions" (which seemingly backfired),[33] and in 2015, YouTube incorporated "user satisfaction" as an optimization goal in its recommender algorithms.[34] Researchers have also argued for the inclusion of alternative welfare-oriented goals in recommender algorithms, like well-being at the individual or community level.[35]

Indeed, it is also possible to create multi-objective ranking systems—which, as the name suggests, optimize multiple ranking objectives—that have been shown to improve both engagement and satisfaction metrics, at least for video-sharing platforms.[36] The goals for a multi-objective recommender algorithm could be diverse and even niche, like reducing exposure to "unhealthy" recommendations for the most vulnerable users (such as those who have a high health risk score).[37] Another approach is multi-stakeholder recommendation, which shifts the focus from user-centrism—that is, optimization solely for user experience—to the accommodation of the concerns of other stakeholders, including content creators and sellers.[38] Recommender algorithms could also be organized around subjects like local

content/uploads/2025/02/Better-Feeds_-Algorithms-That-Put-People-First.pdf [https://perma.cc/JF9K-WRNC].

33. Keach Hagey & Jeff Horwitz, *Facebook Tried to Make Its Platform a Healthier Place. It Got Angrier Instead.*, WALL ST. J. (Sept. 15, 2021), https://www.wsj.com/articles/facebook-algorithm-change-zuckerberg-11631654215 [https://perma.cc/M4P3-WLEV (staff-uploaded, dark archive)].

34. Jonathan Stray, *Aligning AI Optimization to Community Well-Being*, 3 INT'L J. CMTY. WELL-BEING 443, 449–50 (2020).

35. *Id.* at 451–52.

36. Yong Zheng & David (Xuejun) Wang, *A Survey of Recommender Systems with Multi-Objective Optimization*, 474 NEUROCOMPUTING 141, 144 (2022).

37. Ashudeep Singh et al., *Building Healthy Recommendation Sequences for Everyone: A Safe Reinforcement Learning Approach* 1–2 (2021), https://www.ashudeepsingh.com/publications/facctrec2020_singh_et_al.pdf [https://perma.cc/LH5C-BE7F].

38. Harshal A. Chaudhari, Sangdi Lin & Ondrej Linda, *A General Framework for Fairness in Multistakeholder Recommendations*, ARXIV 1 (2020), https://export.arxiv.org/pdf/2009.02423v1.pdf [https://perma.cc/926R-Z4MT].

communities and their problems,[39] active political engagement or civic discourse, or values of inclusivity.[40]

The concern with the homogenous nature of proprietary recommender algorithms is not simply that their optimization goals of "engagement" or "time spent" are particularly perverse. But any social media platform that supports only one recommender algorithm must inevitably choose from a wide, contested range of optimization values like accuracy, privacy, inclusiveness, or equity.[41] Ultimately, the choice of optimization goals reflects an exercise in value prioritization and ethical trade-offs.[42] Using a single proprietary recommender algorithm—with its limited range of optimization values for such a culturally, economically, and politically diverse user base—leads to value homogenization. Users have little control over the data points included in the recommendation decision or the values the algorithm optimizes for. This "one-size-fits-all" approach denies users control over the structure, functioning, and value trade-offs embedded in the social media experience.

A healthy digital public sphere requires a diversity of institutions with different norms, instead of just one set of norms imposed by a single private actor.[43] A single set of private norms (in the form of

39. Chand Rajendra-Nicolucci & Ethan Zuckerman, *Local Logic: It's Not Always a Beautiful Day in the Neighbourhood*, KNIGHT FIRST AMEND. INST. (Nov. 30, 2020), https://knightcolumbia.org/blog/local-logic-its-not-always-a-beautiful-day-in-the-neighborhood [https://perma.cc/N79R-DH3A].

40. Chand Rajendra-Nicolucci & Ethan Zuckerman, *Civic Logic: Social Media with Opinion and Purpose*, KNIGHT FIRST AMEND. INST. (Nov. 20, 2020), https://knightcolumbia.org/blog/civic-logic-social-media-with-opinion-and-purpose [https://perma.cc/4FXW-JTQ7].

41. *See generally* Jonathan Stray Ivan Vendrov, Jeremy Nixon, Steven Adler & Dylan Hadfield-Menell, *What Are You Optimizing for? Aligning Recommender Systems with Human Values*, CORNELL U. (2021), https://arxiv.org/pdf/2107.10939 [https://perma.cc/J5L6-4HZV]; Claire Leibowicz, Connie Moon Sehat, Adriana Stephan & Jonathan Stray, *If We Want Platforms to Think Beyond Engagement, We Have to Know What We Want Instead*, MEDIUM: AI& (Nov. 9, 2021), https://medium.com/partnership-on-ai/if-we-want-platforms-to-think-beyond-engagement-we-have-to-know-what-we-want-instead-a8cfbfbf6688 [https://perma.cc/LVU5-8GCL].

42. Stray, *supra* note 41, at 4; Leibowicz et al., *supra* note 41.

43. Jack M. Balkin, *How to Regulate (and Not Regulate) Social Media*, 1 J. FREE SPEECH L. 71, 76–77 (2021).

content moderation, curation, and ranking guidelines) will stifle public discourse. Instead, users need many players to set their own community standards and values.[44] Having many social media platforms or many smaller online communities will help avoid a monoculture of content moderation, remedy problems of scale, and incentivize innovation.[45]

III. THE CASE FOR MIDDLEWARE: A BROAD-SPECTRUM STRUCTURAL SOLUTION

"Middleware," as suggested by Francis Fukuyama and his colleagues at Stanford, is a structural intervention that introduces competition on top of existing platforms by unbundling the underlying inventory layer (where content is posted) from the recommender algorithm (which curates and ranks this content).[46] Middleware replaces the platform's proprietary algorithm with a marketplace of third-party recommender algorithms, allowing users to choose from a host of options.[47] A few illustrations would help to understand the idea of middleware. In a competitive market for middleware, free speech absolutists could choose a recommender algorithm that does not remove any content but simply ranks it—whether based on relevance, time posted, or any other metric. On the other end of the spectrum, parents of children using social media or others who wish to avoid exposure to certain types of content could choose middleware with more stringent moderation policies that filter all violent or sexual content. Yet others could choose middleware that displays only fact-checked content from verified journalistic sources. Essentially, the social media platform would handle only the inventory layer: Subsequent stages of integrity checks, candidate generation, and ranking would be executed by the middleware provider.

Variants of this idea have emerged in recent times, either independently or as part of a bundle of proposals for reimagining social media. Some have suggested a simple version of interoperability for social media that only allows cross-posting of content across

44. *Id.* at 80.
45. *Id.* at 84.
46. Fukuyama, *supra* note 5.
47. *Id.* at 30.

different platforms.[48] The Initiative for Digital Public Infrastructure ("IDPI"), as part of its vision for a small, dense, diverse internet, is creating a tool (a "loyal client") that aggregates and organizes content from different social media platforms.[49] To reduce the inefficiency and redundancy of flitting between different social media apps, IDPI's Gobo project will import a user's feed from across different social media websites (e.g., X, Mastodon, Reddit) into one app.[50] This new architecture will also allow users to customize their own "lenses," apply their own filters by selecting a few parameters, choose their own algorithms for sorting the aggregated posts, and even use third-party services to assist in filtering and sorting (analogous to the idea of middleware).[51]

Similarly, the Partnership on AI recommends that platforms not only make their recommender algorithms more customizable, but also incentivize the creation of different feeds that serve myriad interests and values.[52] For example, social media users could choose a feed curated by a prominent news publisher like the BBC or an independent media coalition.[53] A user might trust the algorithm created by an independent news media coalition to filter, curate, and rank news and discussions, especially during elections. Similarly, during a health crisis like COVID-19, users might prefer to use an algorithm created by trusted sources like the World Health Organization or the Centers for Disease Control as an additional overlay to filter out inaccurate information on their social media feeds.

Some proposals also suggest incorporating greater user controls within a social media platform's proprietary algorithm. These controls could allow a user to select and adjust the factors used in making recommendations, exclude certain categories of recommendations,

48. Fiona M. Scott Morton et al., *Equitable Interoperability: The "Supertool" of Digital Platform Governance*, 40 YALE J. ON REG. 1013, 1016–18 (2023).

49. Chand Rajendra-Nicolucci et al., *supra* note 12.

50. Spencer Lane, *Gobo 2.0: All Your Social Media in One Place*, INITIATIVE FOR DIGIT. PUB. INFRASTRUCTURE UMASS AMHERST (Nov. 9, 2022), https://publicinfrastructure.org/2022/11/09/gobo-2-0-all-your-social-media-in-one-place/ [https://perma.cc/L7LE-R8QE].

51. *Id.*

52. Stray, *supra* note 31.

53. *Id.*

and choose between receiving personalized recommendations or algorithmically curated content.[54] Indeed, Bluesky, a new X competitor, has already introduced a "marketplace of algorithms."[55] Early users of Bluesky have reported finding such control refreshing and empowering.[56]

All these variants of the middleware idea are gaining traction due to their versatility in solving a wide range of social media problems. Some have noted that most problems that arise on social media platforms can be classified into three categories: speech, privacy, and competition.[57] Middleware is a broad-range solution that will mitigate at least two of these three broad concerns: competition and speech. It will also offer additional benefits like transparency and explainability. The impact of middleware on privacy is more contentious and is discussed in Part VI. The following Section explores the broad range of benefits middleware could offer to the social media ecosystem.

A. Content Moderation

"One man's vulgarity is another's lyric."[58] Agreeing on the boundaries of content moderation, or even choosing a process or agency that should be empowered to draft content moderation

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54. Spandana Singh, *Why Am I Seeing This? How Video and E-Commerce Platforms Use Recommendation Systems to Shape User Experiences*, NEW AM. 44 (March 25, 2020), https://d1y8sb8igg2f8e.cloudfront.net/documents/Why_Am_I_Seeing_This_2020-03-25.pdf [https://perma.cc/7993-MNPB]; Maximilian Gahntz, *Towards Responsible Recommending: Recommendations for Policy Makers & Large Online Platforms on How to Move Towards a More Responsible Recommending Ecosystem*, MOZILLA (Dec. 7, 2022), https://foundation.mozilla.org/en/research/library/towards-responsible-recommending/towards-responsible-recommending-report/[https://perma.cc/GL98-DHVH (staff-uploaded)].

55. *Algorithmic Choice with Custom Feeds*, *supra* note 14; *Bluesky: An Open Social Web*, BLUESKY (Feb. 22, 2024), https://bsky.social/about/blog/02-22-2024-open-social-web [https://perma.cc/ZS85-6WVJ].

56. Chris Stokel-Walker, *Bluesky's Custom Algorithms Could Be the Future of Social Media*, WIRED (June 3, 2023, 7:00 AM), https://www.wired.com/story/bluesky-my-feeds-custom-algorithms/ [https://perma.cc/3DG7-DSH7]; Jay Peters, *Bluesky Rolls out Feeds with Custom Algorithms*, VERGE (May 26, 2023, 4:17 PM EDT), https://www.theverge.com/2023/5/26/23739174/bluesky-custom-feeds-algorithms-twitter-alternative [https://perma.cc/4DK3-QEXX].

57. Keller, *supra* note 15, at 172.

58. Cohen v. California, 403 U.S. 15, 25 (1971).

guidelines, is a controversial endeavor beset with difficulties.[59] The task of setting bright-line rules for permissible and prohibited speech for a culturally and politically diverse audience on social media is extremely difficult.[60] A competitive market for middleware would tackle this issue: People could choose from several options, each offering different norms of content moderation. Free speech absolutists could choose an option that does not censor content and simply ranks it. On the other end of the spectrum, parents of children using social media could choose middleware with more stringent content moderation policies. Yet others could choose middleware that displays only fact-checked content from established journalistic sources.

A handful of third-party plug-ins already provide additional integrity checks or content moderation services. For example, Block Party, an anti-harassment tool designed specifically for X,[61] does not rank content but blocks potentially harassing content.[62] Mastodon, a federated network that has emerged as an alternative to X, allows individual server admins to set their own moderation policies.[63] Similarly, Reddit adopts a decentralized approach where different subreddits can create their own moderation guidelines and rely on user volunteers who enjoy wide discretion in decision-making.[64] While

59. *See generally* Evelyn Douek, *Content Moderation as Systems Thinking*, 136 HARV. L. REV. 526 (2022); Newton Minow & Martha Minow, *Social Media Companies Should Pursue Serious Self-Supervision — Soon: Response to Professors Douek and Kadri*, 136 HARV. L. REV. F. 428 (2023); Kate Klonick, *Of Systems Thinking and Straw Men*, 136 HARV. L. REV. F. 339 (2023).

60. Douek, *supra* note 59, at 529–30, 537.

61. Tracy Chou, *Block Party's Founding Story*, BLOCK PARTY, https://www.blockpartyapp.com/about-us/ [https://perma.cc/N34B-EUPN] (last visited May 3, 2024).

62. *Block Party's Twitter Product Is on Indefinite Hiatus as of May 31*, BLOCK PARTY (May 30, 2023), https://www.blockpartyapp.com/blog/twitter-hiatus/ [https://perma.cc/DT5R-5B6P]. Block Party is now on an indefinite hiatus after X placed its API behind a paywall. *Id.*

63. *Moderation Actions*, MASTODON, https://docs.joinmastodon.org/admin/moderation/ [https://perma.cc/K7BV-38K7] (last visited Apr. 8, 2025).

64. Spandana Singh, *Everything in Moderation: An Analysis of How Internet Platforms Are Using Artificial Intelligence to Moderate User Generated Content*, NEW AM. 26 (July 2019), https://d1y8sb8igg2f8e.cloudfront.net/documents/Everything_in_Moderation_2019-07-15_142127_tq36vr4.pdf [https://perma.cc/7ZWQ-54EU].

Block Party served a very specific demand for anti-harassment filters, platforms like Mastodon, Bluesky, and Reddit are broadly premised on the understanding that users' content preferences are diverse and impossible to satisfy through a common set of moderation guidelines. Allowing people to select their own content moderation norms by choosing from among a range of middleware providers could satisfy these highly differentiated demands.

However, middleware could also exacerbate concerns about "echo chambers" on social media platforms.[65] Critics allege that social media recommender algorithms limit exposure to contrarian views and increase polarization.[66] Smaller, fragmented networks on social media might pose the risk of the proliferation of dangerous or extremist content,[67] even facilitating the creation of insular, fragmented communities that fuel polarization. However, polarization predates social media: Social media does not cause divisiveness, though it may intensify it.[68] Technology cannot be expected to solve these larger societal problems like a widespread breakdown of trust and divisiveness.

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65. Brent Kitchens et al., *Understanding Echo Chambers and Filter Bubbles: The Impact of Social Media on Diversification and Partisan Shifts in News Consumption*, 44 MIS Q. 1619, 1619 (2020); Brendan Nyhan et al., *Like-Minded Sources on Facebook Are Prevalent but Not Polarising*, 620 NATURE 137, 137–44 (2023) (explaining that the evidence on the role of social media in creating echo chambers seems inconclusive).

66. Ro'ee Levy, *Social Media, News Consumption, and Polarization: Evidence from a Field Experiment*, 111 AM. ECON. REV. 831, 831 (2021); Levi Boxell, Matthew Gentzkow & Jesse M. Shapiro, *Is the Internet Causing Political Polarization? Evidence from Demographics* 1 (Nat'l Bureau of Econ. Rsch., Working Paper No. 23258, 2017), https://www.nber.org/system/files/working_papers/w23258/w23258.pdf [https://perma.cc/2MUQ-3BMD].

67. Ethan Zuckerman, *Social Media Is Getting Smaller—and More Treacherous*, WIRED, https://www.wired.com/story/social-media-is-getting-smaller-and-more-treacherous/ [https://perma.cc/QWT6-786X]; Annie Y. Chen et al., *Subscriptions and External Links Help Drive Resentful Users to Alternative and Extremist YouTube Channels*, SCI. ADVANCES, Sept. 1, 2023, at 2.

68. *See* Paul M. Barrett, *Fueling The Fire: How Social Media Intensifies U.S. Political Polarization – And What Can Be Done About It*, NYU STERN CTR. FOR BUS. & HUM. RTS. (Sept. 2021), https://bhr.stern.nyu.edu/publication/fueling-the-fire-how-social-media-intensifies-u-s-political-polarization-and-what-can-be-done-about-it/ [https://perma.cc/MM7V-G8GQ].

Middleware might not shield those who choose an algorithm with few or no filters or with specific parameters that put them in an extremist echo chamber. However, it will protect unsuspecting, vulnerable individuals from being uncontrollably or unconsciously exposed to extremist content or conspiracy theories.[69] People who feel that they (or their children) might be at a heightened risk of online radicalization—whether due to impressionability, poor mental health, or other factors—could choose a middleware provider that filters out propaganda or fake news.

Imposing a singular set of speech norms is both legally and normatively indefensible, especially in the U.S., where the shadow of the First Amendment looms large.[70] However, this choice of speech norms should be *made consciously by users* rather than being uncontrollably dictated by the automated systems of a social media platform. A marketplace of algorithms could provide this spectrum of content moderation norms for users to choose from.

B. Concentration & Power Asymmetries

The biggest social media platforms like Facebook and Instagram, which are both owned by Meta, enjoy significant, unbridled, unaccountable power.[71] The Federal Trade Commission ("FTC"), in an antitrust suit, has produced evidence to show that Facebook and Instagram are the two largest social networking sites in the U.S.[72]

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69. Kevin Roose, *The Making of a YouTube Radical*, N.Y. TIMES (June 8, 2019), https://www.nytimes.com/interactive/2019/06/08/technology/youtube-radical.html [https://perma.cc/Q9T7-WTDQ (staff-uploaded, dark archive)].

70. Gilad Edelman, *The Parler Bans Open a New Front in the "Free Speech" Wars*, WIRED (Jan. 13, 2021, 7:00 AM), https://www.wired.com/story/parler-bans-new-chapter-free-speech-wars/ [https://perma.cc/2LE3-55DM].

71. SUBCOMM. ON ANTITRUST, COM. & ADMIN. L. OF THE COMM. ON THE JUDICIARY, INVESTIGATION OF COMPETITION IN DIGITAL MARKETS., 117TH CONG., MAJORITY STAFF REP. AND RECOMMENDATIONS 133–34 (Comm. Print 2020) [hereinafter MAJORITY STAFF REP.].

72. First Amended Complaint at 60–70, F.T.C. v. Facebook, Inc., No.: 1:20-cv-03590 (filed Aug. 19, 2021), https://www.ftc.gov/legal-library/browse/cases-proceedings/191-0134-facebook-inc-ftc-v [https://perma.cc/27U8-NY2G] [hereinafter Facebook Complaint] (distinguishing the market for "personal social networking" in which Facebook, Instagram and Snapchat operate from

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Other jurisdictions, like the U.K.,[73] Australia,[74] the EU,[75] and India,[76] have also noted Facebook's substantial market power in their respective markets. Facebook, on the other hand, claims it operates in a competitive and dynamic marketplace where it faces intense competition from newcomers (like Snapchat, TikTok, and BeReal) and established incumbents (like X, Pinterest, and Reddit), and that all this vibrant competition is "just a click away."[77] However, these claims are refuted by data showing perpetually high market shares in terms of active users and time spent.[78]

Facebook's market position is further made unassailable by high entry barriers. Strong network effects, high switching costs, and the incumbent's significant data advantage all contribute to creating these high entry barriers.[79] Even the successful entry of new players, like TikTok, does not necessarily controvert Facebook's market power because TikTok had to build a highly differentiated product using short-form videos by relying on content from creators instead of posts

general social media platforms that focus on the broadcast and discovery of content based on user's interests like X, TikTok, Reddit, Pinterest, etc.).

73. COMPETITION & MKTS. AUTH., ONLINE PLATFORMS AND DIGITAL ADVERTISING, MARKET STUDY FINAL REPORT 119–31 (July 1, 2020) (U.K), https://assets.publishing.service.gov.uk/media/5fa557668fa8f5788db46efc/Final_report_Digital_ALT_TEXT.pdf [https://perma.cc/WSG7-DMBX] [hereinafter CMA DIGITAL ADVERTISING STUDY].

74. AUSTRALIAN COMPETITION & CONSUMER COMM., DIGITAL PLATFORMS SERVICES INQUIRY, INTERIM REPORT 6: REPORT ON SOCIAL MEDIA SERVICES 13 (Mar. 2023), https://www.accc.gov.au/system/files/Digital%20platforms%20services%20inquiry%20-%20Interim%20report%206%20-%20Report%20on%20social%20media%20services_0.pdf [https://perma.cc/HFP5-AJUR] [hereinafter ACCC REPORT].

75. European Commission Press Release IP/22/7728, Antitrust: Commission Sends Statement of Objections to Meta over Abusive Practices Benefiting Facebook Marketplace (Dec. 18, 2022), https://ec.europa.eu/commission/presscorner/detail/en/ip_22_7728 [https://perma.cc/85DW-GPEU (staff-uploaded)].

76. WhatsApp LLC vs. Competition Commission of India, AIROnline 2021 Del 547.

77. MAJORITY STAFF REP., *supra* note 71, at 135–36.

78. *Id.* at 137–40.

79. *Id.* at 141–50; Facebook Complaint, *supra* note 72, at 70–72.

from connections.[80] It could not compete with Facebook in its home terrain—the traditional social graph model; to overcome these incumbent advantages, it had to build something that did not rely on network effects the same way that Facebook does.[81]

There have been very few entrants in the market in the last decade, even though there are huge profits to be made.[82] Even successful entrants have built products that are differentiated from Facebook in appreciable ways, indicating the platform's market power.[83] Further, Facebook allegedly resorted to a systemic strategy of copying products and burying or illegally acquiring competitors[84] to the point where startups operating in markets closely associated with Facebook's products were infamously said to exist in the "kill zone."[85] Specifically, the FTC claimed that Facebook's acquisition of Instagram and WhatsApp was motivated by Facebook's need to neutralize a competitive threat.[86]

Social media platforms enjoy disproportionate bargaining power vis-à-vis groups that rely on their services: (1) content consumers, (2) content creators, and (3) third-party businesses. Given their power, the biggest social media platforms can unilaterally change terms and conditions, including those pertaining to data protection and targeted

80. Cal Newport, *TikTok and the Fall of the Social-Media Giants*, NEW YORKER (July 28, 2022), https://www.newyorker.com/culture/cultural-comment/tiktok-and-the-fall-of-the-social-media-giants [https://perma.cc/3DXG-NZ9G].

81. *Id.*; ACCC REPORT, *supra* note 74, at 121.

82. Morton, *supra* note 48.

83. *Id.*

84. MAJORITY STAFF REP., *supra* note 71, at 163; Press Release, F.T.C., FTC Alleges Facebook Resorted to Illegal Buy-or-Bury Scheme to Crush Competition After String of Failed Attempts to Innovate (Aug. 19, 2021), https://www.ftc.gov/news-events/news/press-releases/2021/08/ftc-alleges-facebook-resorted-illegal-buy-or-bury-scheme-crush-competition-after-string-failed [https://perma.cc/E3LT-UR4N].

85. Asher Schechter, *Google and Facebook's "Kill Zone": "We've Taken the Focus Off of Rewarding Genius and Innovation to Rewarding Capital and Scale"*, PROMARKET (May 25, 2018), https://www.promarket.org/2018/05/25/google-facebooks-kill-zone-weve-taken-focus-off-rewarding-genius-innovation-rewarding-capital-scale/ [https://perma.cc/DAL8-UDKW].

86. Facebook Complaint, *supra* note 72, at 26–42; MAJORITY STAFF REP., *supra* note 71, at 150–61.

advertising, thus harming consumers.[87] Similarly, content creators, including news publishers, are at the mercy of dominant social media platforms—which manifests in the form of onerous revenue-sharing conditions for ads,[88] widespread information asymmetry,[89] lack of control over contractual terms, and denial of access to data about user interaction with news content.[90] Thus, the concentration of power in social media platforms negatively affects all groups that interact with these platforms.

Despite this well-developed account and evidence of monopoly power and unequal bargaining position, very few viable remedies seem available. Middleware promises to infuse competition into the market for social media without compromising the benefits of network effects. As middleware providers compete to acquire customers, they will be forced to find creative ways to design systems for moderation, curation, and ranking. Such competition would improve quality and fuel innovation. It would increase consumer choice and welfare as users would be able to find a middleware provider that most closely reflects their preferences for content curation and moderation.

Other remedies for concentration, such as behavioral prescriptions by the European Commission in its platform cases,[91]

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87. Dina Srinivasan, *The Antitrust Case Against Facebook: A Monopolist's Journey Towards Pervasive Surveillance in Spite of Consumers' Preference for Privacy*, 16 BERKLEY BUS. L.J. 39, 46–54 (2019).

88. Patrick Holder, Haaris Mateen, Anya Schiffrin & Haris Tabakovic, *Paying for News: What Google and Meta Owe US Publishers*, https://ssrn.com/abstract=4704237 [https://perma.cc/M6NF-BJT5 (staff-uploaded)].

89. *See* Emily Bell & Taylor Owen, *The Platform Press: How Silicon Valley Reengineered Journalism*, COLUM. JOURNALISM REV. (Mar. 29, 2017), https://www.cjr.org/tow_center_reports/platform-press-how-silicon-valley-reengineered-journalism.php/ [https://perma.cc/9JPH-87SS].

90. *See* COMPETITION & MKTS. AUTH., PLATFORMS AND CONTENT PROVIDERS, INCLUDING NEWS PUBLISHERS: ADVICE TO DCMS ON THE APPLICATION OF A CODE OF CONDUCT 29–30 (Nov. 2021) (U.K.), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1073411/Platforms_publishers_advice._A.pdf [https://perma.cc/5PJE-LPN6].

91. Letter from Thomas Vinje, Gen. Couns., FairSearch, to Margrethe Vestager, Exec. Vice-President, Eur. Comm. (Nov. 15, 2021), https://fairsearch.org/fairsearch-urges-vestager-to-require-effectuve-google-shopping-remedies/ [https://perma.cc/Z5NC-4ZMS]; Thomas Hoppner, *Google's (Non-) Compliance*

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have proven ineffective against the problems of social media, which seem more structural.[92] Penalties, however high, have failed to produce a deterrent effect, and even ex ante regulations like the Digital Markets Act[93] ("DMA") and the Digital Services Act[94] ("DSA") have prompted little change; companies are quick to find workarounds or other ways to avoid compliance with the broader objective of these statutes.[95]

Middleware's primary advantage over these alternative remedies is that it is a structural solution. Even ex ante gatekeeper regulations—like the DMA, DSA, or other proposals to regulate social media as a public utility or essential infrastructure—do not target the structure of social media.[96] Middleware, on the other hand, dismantles existing power hubs and provides an opportunity for disempowered groups

with the EU Shopping Decision, HAUSFELD (Sept. 2020), https://www.hausfeld.com/uploads/documents/googles_(non)_compliance_with_google_search_(shopping).pdf [https://perma.cc/X7F5-KLFQ]; Natasha Lomas, *Google Antitrust Complainants Call for EU to Shutter Its Shopping Ads Units*, TECHCRUNCH (Oct. 18, 2022), https://techcrunch.com/2022/10/18/eu-antitrust-complaint-google-shopping-units/ [https://perma.cc/CAC7-VHQE].

92. Alison Griswold & Amanda Shendruk, *It Will Take More than Big Fines to Tame Big Tech*, QUARTZ (2019), https://qz.com/1744038/why-antitrust-fines-arent-enough-to-rein-in-the-tech-giants [https://perma.cc/JSA6-X3CL].

93. Regulation 2022/1925 of the European Parliament and of the Council of 14 September 2022 on Contestable and Fair Markets in the Digital Sector and Amending Directives 2019/1937 and 2020/1828 (Digital Markets Act), O.J. (L 119) 1 [hereinafter Digital Markets Act]

94. Regulation 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market for Digital Services and Amending Directive 2000/31/EC (Digital Services Act), O.J. (L 277) 1.

95. Martin Coulter, Foo Yun Chee & Supantha Mukherjee, *Exclusive: Apple Faces "Strong Action" If App Store Changes Fall Short, EU's Breton Says*, REUTERS (Jan. 26, 2024, 4:08 PM EST), https://www.reuters.com/technology/apple-faces-strong-action-if-app-store-changes-fall-short-eus-breton-says-2024-01-26/ [https://perma.cc/S2XD-6AY9 (staff-uploaded)]; Ryan Browne, *Amazon, Microsoft, Meta and Others Accused by Rivals of Not Respecting New EU Competition Rules*, CNBC (2024), https://www.cnbc.com/2024/01/16/24-companies-sign-open-letter-saying-big-tech-isnt-respecting-eu-dma.html [https://perma.cc/D4K8-GE4Q]; *Apple's Proposed Changes Reject the Goals of the DMA*, SPOTIFY: FOR THE RECORD (Jan. 26, 2024), https://newsroom.spotify.com/2024-01-26/apples-proposed-changes-reject-the-goals-of-the-dma/ [https://perma.cc/T8U3-SXEZ].

96. *See* Rahman, *supra* note 2; Rahman, *supra* note 3; TEACHOUT, *supra* note 2.

(consumers, creators, publishers, and businesses) to renegotiate their power relations. Deconstructing parts of social media by splitting inventory from the subsequent stages of integrity check, candidate generation, and ranking would significantly disintegrate platforms' concentrated power. It would reduce the reliance of disempowered groups (consumers, creators and businesses) on the social media platform and provide an opportunity to renegotiate their power relations with the platform and middleware provider.

For example, one way middleware providers could distinguish themselves from their competitors is by providing news publishers or content creators more information about their ranking processes, or a greater share in ad revenue, thus helping them reclaim some lost power. Instead of relying almost exclusively on a social media monopoly for distribution and visibility, multiple middleware providers would collectively shape news distribution, increasing the relative power of news publishers.

Given the ossified nature of social media platforms, the power relations between different actors have also become embedded. Hence, when the underlying structure remains unchanged, attempts to renegotiate relations or strike a new deal have proven futile. For example, people warn that the News Media Bargaining Code[97] in Australia and similar proposals in Canada,[98] which compel digital platforms like Meta and Google to negotiate with and compensate news publishers, are grossly inadequate; they fail to change the underlying structure that generated the unequal bargaining positions.[99] Similarly, merely prohibiting self-preferencing or

97. Treasury Laws Amendment (News Media and Digital Platforms Mandatory Bargaining Code) Bill 2021 (Cth) No. 21 (Austl.).

98. Online News Act, Bill C-18, 44th Parl., S.C. 2023, c 23 (Can.).

99. Benedetta Brevini, *Making Big Tech Pay for News: The Australian Media Bargaining Code Will not Solve the Crisis in Journalism*, MEDIA REFORM COALITION (U.K.), https://mediareform.org.uk/ [https://perma.cc/YU8N-FT46] (last visited May 3, 2024); Mathew Ingram, *Canada Imitates Australia's News-Bargaining Law, but to What End?*, COLUM. JOURNALISM REV. (Mar. 16, 2023), https://www.cjr.org/the_media_today/canada_australia_platforms_news_law.php [https://perma.cc/NH7G-C6SQ]; Derek Wilding, *Australia's News Media Bargaining Code: Did Facebook, Google Cave?*, PROMARKET (Feb. 25, 2021), https://www.promarket.org/2021/02/25/google-facebook-australia-news-

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mandating the inclusion of a choice screen on platforms [100] has proven ineffective: These measures, too, fail to remedy the underlying structural disparities that elicit exploitative and exclusionary behavior. Only when the *structure* of social media is changed will there be renewed opportunity for groups to renegotiate their relationships and seize greater control over their outcomes.

C. *Transparency & Explainability*

Middleware could also tap into the powers of the market to produce additional benefits. At present, social media platforms have little incentive to disclose details about the functioning of their recommender algorithms. On the contrary, platforms closely guard their proprietary algorithms to retain their competitive edge. Middleware providers, though, would have to disclose much more information about their algorithms to distinguish themselves from competitors. This would pave the way for an environment of greater transparency and disclosure regarding goals, metrics, and weights.

As middleware would vest control in the user, disclosures would have to be made in a style that is easily comprehensible—say through visual previews that allow users to compare feeds across different

bargaining-antitrust-accc-small-publishers/[https://perma.cc/T4CS-856H]; Diana Bossio & Belinda Barnet, *The News Media Bargaining Code: Impacts on Australian Journalism One Year On*, 15 POLICY & INTERNET 611, 623 (2023).

100. Hiroshi Lockheimer, *Complying with the EC's Android Decision*, GOOGLE (Oct. 6, 2018), https://blog.google/around-the-globe/google-europe/complying-ecs-android-decision/ [https://perma.cc/LE96-AZ6C]; Oliver Bethell, *Changes to the Android Choice Screen in Europe*, GOOGLE (June 8, 2021), https://blog.google/around-the-globe/google-europe/changes-android-choice-screen-europe/ [https://perma.cc/2DMT-CRKU]; Natasha Lomas, *Europe's Android "Choice" Screen Keeps Burying Better Options*, TECHCRUNCH (Mar. 8, 2021), https://techcrunch.com/2021/03/08/europes-android-choice-screen-keeps-burying-better-options/ [https://perma.cc/YYC4-L3VR] [hereinafter Lomas, *Europe's Android "Choice" Screen*]; Natasha Lomas, *Google's EU Android Choice Screen Isn't Working Say Search Rivals, Calling for a Joint Process to Devise a Fair Remedy*, TECHCRUNCH (Oct. 27, 2020), https://techcrunch.com/2020/10/27/googles-eu-android-choice-screen-isnt-working-say-search-rivals-calling-for-a-joint-process-to-devise-a-fair-remedy/ [https://perma.cc/Q5AW-EHC9] [hereinafter Lomas, *Google's EU Android Choice Screen Isn't Working*].

recommender systems.[101] Interactive and illustrative ways of understanding how middleware providers differ from each other would contribute to greater transparency. For example, a middleware provider could allow users to test whether a specific post would be permitted under its content moderation rules. Competitive forces would compel middleware providers to improve the explainability of their algorithms to gain a competitive edge. Unsurprisingly, recommender systems that provide clarification regarding why something is being recommended are known to inspire trust, engagement, and persuasion.[102]

Many of these proposals, including greater disclosures, meaningful explanations, and improved user controls, have also been advanced to improve the functioning of *existing* proprietary recommender algorithms.[103] However, given the lack of competitive pressure or regulatory requirements, dominant social media platforms have no incentive to create explainable recommender algorithms. Creating a market for middleware would build competitive pressure to distinguish themselves from competitors by disclosing more information about how their algorithms work.

Aligning commercial interests in this manner could also help channel resources into explainability and transparency. Currently, civil society organizations and the government usually take the lead in spreading awareness about digital harms such as privacy violations and targeted advertising. Middleware, however, could align private interests in the same direction. For a middleware provider that distinguishes itself from competitors based on superior data

101. Tobias Schnabel, Saleema Amershi, Paul N. Bennett, Peter Bailey & Thorsten Joachims, *The Impact of More Transparent Interfaces on Behavior in Personalized Recommendation*, *in* PROCEEDINGS OF THE 43RD INTERNATIONAL ACM SIGIR CONFERENCE ON RESEARCH AND DEVELOPMENT IN INFORMATION RETRIEVAL 991, 991–92 (2020).

102. Gustavo Padilha Polleti, Douglas Luan de Souza & Fabio Cozman, *Why Should I Not Follow You? Reasons For and Reasons Against in Responsible Recommender Systems* (Sept. 8, 2020), https://arxiv.org/pdf/2009.01953 [https://perma.cc/A4QF-UNUH (staff-uploaded)].

103. Singh, *supra* note 54, at 42–46; Spandana Singh, *Rising Through the Ranks: How Algorithms Rank and Curate Content in Search Results and on News Feeds*, NEW AM. (Oct. 2019), https://d1y8sb8igg2f8e.cloudfront.net/documents/Rising_Through_the_Ranks_2019-10-21_134810.pdf [https://perma.cc/DM2F-NNDM].

protection practices or more ethical forms of targeting, the provider itself would want to educate users about these issues so it could convince users to adopt its product.

IV. Regulatory Prerequisites for Middleware's Success

The previous Part discusses the potential for middleware to act as a broad-spectrum structural solution. This Part identifies the regulatory prerequisites for middleware to realize this potential. Specifically, it argues that middleware's success is contingent on mandatory and uniform access to APIs and enforcement of structural separation (i.e., prohibiting the social media platform handling inventory from providing its own recommender algorithm).

A. Mandatory & Uniform Access to APIs

Creating a market for middleware will require access to APIs so third parties can create recommender systems that integrate with, and operate seamlessly on top of, the social media platform. In fact, many social media platforms already provide access to APIs to allow external developers to create tools for their platforms.[104] However, platforms still exercise extensive control over terms of access and can arbitrarily change the conditions or foreclose rivals from accessing APIs.[105] Often, they prohibit third-party apps from directly competing with the social media platform, or from promoting rivals.[106] For instance, in the immediate aftermath of the launch of Google's social network, Google+, Facebook introduced a new policy preventing third-party apps that used Facebook's APIs from integrating with any other competing social platform—an action that was clearly aimed at preventing Google+ from gaining popularity.[107]

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104. *See* TIKTOK FOR DEVS., https://developers.tiktok.com/ [https://perma.cc/9LMM-7K27] (last visited Apr. 9, 2025; Homepage for Developers on Facebook, META, https://developers.facebook.com/products/business-sdk/ [https://perma.cc/9YR2-LN8A] (last visited Apr. 9, 2025); Homepage for Developers on Instagram, META, https://developers.facebook.com/products/instagram [https://perma.cc/U323-FTH5] (last visited Apr. 9, 2025).

105. Facebook Complaint, *supra* note 72.

106. Facebook Complaint, *supra* note 72, at 43–45.

107. *Id.* at 43.

Facebook is also known to enforce its platform policies unevenly and has previously terminated API access of third parties that were potential competitive threats. Examples include Vine, a short video-sharing platform, and Circle, a location-based photo-sharing platform.[108] Though Vine users were previously able to connect with their Facebook friends through APIs, once X acquired Vine, Facebook modified its APIs, making it impossible for Vine users to upload videos to Facebook.[109] Moreover, the terms of accessing Facebook's APIs are often not reciprocal. For instance, the U.K.'s Competition and Markets Authority notes that, for some time, users were allowed to cross-post content from other social media sites onto their Facebook page but not the reverse—increasing the overall content available on Facebook but not on other platforms.[110]

Other social media platforms also control APIs opportunistically and arbitrarily. Recently, X abruptly discontinued free access to its APIs, affecting not just creative third-party plug-ins that provided niche services atop X's platform but also researchers studying topics like misinformation and hate speech.[111] Similarly, Reddit has started charging fees for API access, rendering many third-party apps untenable.[112]

Weaponizing APIs to act against emerging competition chills competition and innovation.[113] The status quo, where third parties rely on the largesse of social media platforms to gain access to APIs, is not conducive to the creation of a robust and reliable marketplace for middleware. Hence, regulation is needed to ensure both mandatory and uniform access to APIs. Several regulatory frameworks might prove relevant for this purpose.

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108. MAJORITY STAFF REP., *supra* note 71, at 169–170.

109. Morton, *supra* note 48, at 1031–32.

110. CMA DIGITAL ADVERTISING STUDY, *supra* note 73, at 142.

111. Ivan Mehta & Manish Singh, *Twitter to End Free Access to Its API in Elon Musk's Latest Monetization Push*, TECHCRUNCH (Feb. 2, 2023), https://techcrunch.com/2023/02/01/twitter-to-end-free-access-to-its-api/ [https://perma.cc/5JRN-52ST].

112. Ivan Mehta, *Developers of Third-Party Reddit Apps Fear Shutdown Because of API Pricing Changes*, TECHCRUNCH (June 1, 2023), https://techcrunch.com/2023/06/01/developers-of-third-party-reddit-apps-fear-shutdown-because-of-api-pricing-changes/ [http://perma.cc/WX8K-6C2D].

113. Facebook Complaint, *supra* note 72, at 52.

1. Antitrust Tools

Antitrust has a long history of using interoperability as a remedy for unilateral conduct by dominant firms.[114] For example, the decree breaking up AT&T into independent parts also stipulated mandatory interoperability and exchange access equal in type and quality between the newly independent factions.[115] Two theories in antitrust law are especially relevant to pursuing a remedy of interoperability: the essential facilities doctrine and tying.[116]

Some useful lessons might be drawn from the Microsoft antitrust cases, which involved their own version of "middleware." In the Microsoft cases, "middleware" referred to software that acted as the interface between the Windows operating system ("OS") and application software.[117] The two primary middleware threats to Microsoft were Netscape's Navigator and Sun's Java Programming Language, which were designed to enable developers to write interoperable software.[118] Netscape disclosed its APIs, inviting developers to write programs that could run on top of Navigator. Both Navigator and Java were platform-neutral, and software developed on top of them could run on many different OSs.[119] By enabling a suite of application software that worked across different OSs, middleware threatened not just Microsoft's downstream products (like Internet Explorer, Media Player, and Office applications) but also its core upstream product: Windows OS.[120]

In response to this competitive threat, Microsoft engaged in several questionable practices, including tying, exclusive dealing, and

114. Herbert Nokamp, *Antitrust Interoperability Remedies*, 123 COLUM. L. REV. F. 1, 7–14 (2023).

115. United States v. AT&T Co., 552 F. Supp. 131, 142 (D.D.C. 1983).

116. Chris Riley, *Unpacking Interoperability in Competition*, 5 J. CYBER POL'Y 94, 95–96 (2020).

117. *See* United States v. Microsoft Corp., 215 F. Supp. 2d 1, 16 (D.D.C. 2002) (approving consent decree that prohibited Microsoft from excluding non-Microsoft browsers from its operating system), *aff'd*, 373 F.3d 1199 (D.C. Cir. 2004).

118. ANDREW I. GAVIL & HARRY FIRST, THE MICROSOFT ANTITRUST CASES: COMPETITION POLICY FOR THE TWENTY-FIRST CENTURY 329 (2014).

119. *Id.* at 68.

120. *Id.* at 151.

leveraging.[121] The final settlement reached in this case compelled Microsoft to disclose the APIs that were needed for middleware to interoperate with Windows OS.[122] It also prohibited other tying and bundling practices that could have foreclosure effects in both upstream and downstream markets.[123]

Similar to the U.S., the European Commission also concluded that Microsoft's refusal to disclose its interface specifications amounted to an abuse of its dominant position in the market for Windows OS, according to the essential facility doctrine.[124] Many believe that forcing Microsoft to disclose its APIs to middleware caused a surge in innovation and paved the path for the rise of many new software companies like Google, Facebook, and Amazon.[125]

Similar to the AT&T and Microsoft antitrust cases, interoperability and mandatory disclosure of APIs could also be demanded from Facebook as an antitrust remedy.[126] However, there are some concerns with the viability of this approach. First, tying or bundling claims arise only if a seller requires that two distinct commodities be purchased together.[127] Social media platforms could argue that their inventory and review-ranking algorithms are not distinct but *one* integrated product, built as such since their inception. Even if some components of review and ranking (like the machine

121. *Id.* at 159.

122. Stipulation at 3, United States v. Microsoft Corp., No. 98 Civ. 1232 (D.D.C. Nov. 6, 2001), https://www.justice.gov/d9/atr/case-documents/attachments/2001/11/06/9495.pdf [https://perma.cc/AD5F-A6LU].

123. *Id.* at 4 (prohibiting Microsoft from retaliating against OEMs that facilitate Microsoft's competitors, licensing Windows OS on a uniform non-discriminatory basis, etc.).

124. Commission Decision Nno. COMP/C-3/37.792 (Microsoft Corp.) (Mar. 24, 2004) (summary in 2007 O.J. (L 32) 23), slip op. ¶¶ 548, 560, ec.europa.eu/competition/antitrust/cases/dec_docs/37792/37792_4177_1.pdf [https://perma.cc/5JR7-B8P3], *aff'd*, Case T-201/04, Microsoft Corp. v. Comm'n, 2007 E.C.R. II-3601.

125. Richard Blumenthal & Tim Wu, *What the Microsoft Antitrust Case Taught Us*, N.Y. TIMES (May 18, 2018), https://www.nytimes.com/2018/05/18/opinion/microsoft-antitrust-case.html [https://perma.cc/Z5K9-H39U (staff-uploaded, dark archive)].

126. Nokamp, *supra* note 114, at 34; Philip J. Weiser, *Regulating Interoperability: Lessons from AT&T, Microsoft, and Beyond*, 76 ANTITRUST L.J. 271, 271–72 (2009).

127. Jefferson Par. Hosp. Dist. No. 2 v. Hyde, 466 U.S. 2, 18 (1984).

learning technique) were subsequently added, platforms could argue that those were simply improvements or updates on functionality rather than bundles of different products.

Indeed, arguing that there were two separate products proved challenging in the Microsoft case, even though Internet Explorer is quite clearly a distinct product from Windows OS (and was in fact built subsequent to, and not in conjunction with, the OS).[128] The law of tying struggled to accommodate the conduct of Microsoft then,[129] so the feasibility of this law to capture the bundling (of inventory, review, and ranking) in an even more integrated social media recommender algorithm context seems doubtful. Additionally, using antitrust enforcement to compel interoperability and mandate access to APIs exposes this outcome to the classic vagaries and delays of the judicial process.

2. *Statutory Mandates*

Enactment of a statute that mandates interoperability might be desirable: It would help avoid the delays and uncertainties inherent in antitrust litigation and the difficulties inherent to enforcing and supervising a judicially mandated decree. Even the AT&T interconnection requirement, which originated in an antitrust consent decree, was eventually incorporated in the Telecommunications Act of 1996[130] and has now become uncontroversial standard practice.[131] For antitrust to mandate interoperability for Facebook, the existing essential facilities and refusal to deal doctrines might have to be expanded. Hence, legislation mandating interoperability would be more feasible than an expansion of antitrust jurisprudence.[132]

128. *See generally* GAVIL & FIRST, *supra* note 118, at ch. 1.

129. Nicholas Economides & Ioannis Lianos, *Elusive Antitrust Standard on Bundling in Europe and in the United States in the Aftermath of the Microsoft Cases*, 76 ANTITRUST L .J. 483, 484–85 (2009).

130. 47 U.S.C. § 251.

131. Nokamp, *supra* note 114, at 12.

132. *Id.* at 26 (arguing that for Facebook, "static" interoperability might be an appropriate remedy i.e., requiring Facebook to maintain its data in an accessible format which users can claim when they want to move to another platform).

A number of routes are available for regulatory or statutory implementation of mandatory interoperability, including direct regulation, like in the telecom sector, or indirect regulation through a collective standard-setting organization (where a technical committee agrees upon standard APIs).[133] Some examples of statutorily mandated interoperability already exist. For instance, the DMA in the EU demands interoperability across the messaging platforms of "gatekeepers" for promoting competition.[134] The Data Governance Act[135] and the Data Act[136] in the EU also seek to facilitate fair and non-discriminatory data sharing between businesses with the aim of stimulating competition and creating opportunities for data-driven innovation.[137] Similarly, the proposed American Innovation and Choice Online Act[138] would impose interoperability requirements on gatekeeper platforms.[139] Therefore, a statute could be used to mandate uniform API access or data sharing to enable the creation of a marketplace for middleware providers.

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133. Wolfgang Kerber & Heike Schweitzer, *Interoperability in the Digital Economy*, 8 J. INTELL. PROP. INFO. TECH. & ELEC. COM. L. 39, 44–50 (2017).

134. Digital Markets Act, *supra* note 93, art. 7.

135. Regulation 2022/868 of the European Parliament and of the Council of 30 May 2022 on European data governance and Amending Regulation 2018/1724 (Data Governance Act), O.J. (L 152) 1 [hereinafter Data Governance Act]; *see European Data Governance Act: Shaping Europe's Digital Future*, EUR. COMM., https://digital-strategy.ec.europa.eu/en/policies/data-governance-act [https://perma.cc/HL7L-YFRR] (last updated Oct. 10, 2024).

136. Regulation 2023/2854 of the European Parliament and of the Council of 13 December 2023 on Harmonised Rules on Fair Access to and Use of Data and Amending Regulation 2017/2394 and Directive 2020/1828 (Data Act), O.J. (L) 22.12.2023 [hereinafter Data Act]; *see Data Act*, EUR. COMM. (last updated Oct. 10, 2024), https://digital-strategy.ec.europa.eu/en/policies/data-act [https://perma.cc/C45J-M66X].

137. European Commission Press Release IP/22/1113, Data Act: Measures for a Fair and Innovative Data Economy, Feb. 22, 2022, https://ec.europa.eu/commission/presscorner/detail/en/ip_22_1113 [http://perma.cc/BP3P-FK22]; *see* Data Governance Act, *supra* note 135; Data Act, *supra* note 136.

138. S. 2992, 117th Cong. (2022).

139. *Id.* § 3; Jay B. Sykes, CONG. RSCH. SERV., R47228, *The American Innovation and Choice Online Act* (2022), https://www.congress.gov/crs_external_products/R/PDF/R47228/R47228.5.pdf [https://perma.cc/374A-YAHX].

B. *Structural Separation of Platform & Recommender Algorithms*

The suggestion of interoperability, or open and uniform access to APIs, has been made by others, and most of these proposals demand "equitable" access.[140] In other words, it requires a platform to provide access on qualitatively equal terms, without engaging in self-preferencing or discrimination to favor its own service over competing services.[141]

However, such simple prohibitions against discriminatory API access are likely to be toothless if platforms always have economic incentives and the ability to modify API access in the face of competitive threats. In the context of middleware, this would mean that social media platforms, even after providing access to their APIs, would find technical loopholes to ensure their own recommender algorithms integrate better with the platform. Indeed, Facebook has done this in the past, using interoperability and open APIs opportunistically to incentivize developers to create numerous plug-ins so that users would spend more time on Facebook—thereby making both users and third-party apps increasingly dependent on Facebook.[142]

Many new entrants begin as complements to the social media platform and use the incumbent's APIs. However, this gives the platform immense power over these entrants.[143] A simple prohibition against discriminatory API access would require continuous monitoring to ensure that every time the platform modifies its APIs or rules of access, it does not do so in a self-preferential or anti-competitive manner.[144] And past experience with such simple prescriptive remedies has shown that companies under strong economic incentives always find technical loopholes and workarounds.[145]

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140. Morton, *supra* note 48, at 1016.

141. *Id.*

142. Robert Bodle, *Regimes of Sharing: Open APIs, Interoperability, and Facebook*, 14 INFO. COMMC'N & SOC'Y 320, 325–28, 332–33 (2011).

143. MAJORITY STAFF REP., *supra* note 71, at 90.

144. Riley, *supra* note 116, at 98.

145. *Fairsearch Urges Vestager to Require Effective Google Shopping Remedies*, FAIR SEARCH (Nov. 19, 2021), https://fairsearch.org/fairsearch-urges-vestager-to-

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Even if platforms do not deliberately discriminate against third-party middleware, users might still end up choosing the platform's proprietary algorithm due to choice fatigue, status quo bias, or brand familiarity.[146] Users might assume that the platform's proprietary algorithm offers more seamless integration, or they may have greater familiarity with the platform's services in comparison to those of a third party. This could render the market for middleware redundant.

Hence, to effectively deter platforms from acting in such self-preferential ways, a further degree of structural separation between platforms and middleware providers is necessary. Platform companies should be altogether *prohibited* from providing their own recommender algorithm in competition with third-party middleware providers. Social media companies should operate only the inventory; they should *not* be allowed to participate in the market for middleware.

In the information economy, structural separation is critical to ensure that actors who control the underlying infrastructure are kept separate from those who control venues of access or other layers of the information ecosystem.[147] When an entity has a stake in different layers of the platform, there is an inherent conflict of interest. This is most apparent with Amazon: Its dual role as both seller and e-commerce platform (which matches buyers to sellers) produces a conflict of interest—which leads to self-preferential treatment for Amazon's in-house products and imitation or downgrading of competitors' products.[148]

A similar conflict of interest arising from vertical integration can also be witnessed in social media platforms. When Facebook was

require-effectuve-google-shopping-remedies/ [https://perma.cc/KGK2-4V5F]; Hoppner, *supra* note 91, at 15; Lomas, *supra* note 91.

146. *See generally* Amelia Fletcher et al., *The Effective Use of Economics in the EU Digital Markets Act*, 20 J. COMPETITION L. & ECON. 1, 13 (2024); Amelia Fletcher & Zita Vasa, *Implementing the DMA: The Role of Behavioral Insights*, 15 J. EUR. COMPETITION L. & PRAC. 456, 457–58 (2024); John M. Newman, *Regulating Attention Markets*, https://ssrn.com/abstract=3423487 [https://perma.cc/5MLR-Y5TR (staff-uploaded)] (last updated July 22, 2020).

147. TIM WU, THE MASTER SWITCH: THE RISE AND FALL OF INFORMATION EMPIRES 349–50 (2010).

148. Lina Khan, *Amazon's Antitrust Paradox*, 126 YALE L.J. 710, 770 (2017).

placed in direct competition with some of the businesses and their plug-ins that depended on Facebook (like Vine, MessageMe, and Voxer), Facebook allegedly exploited its upstream position to entrench its dominance and thwart competition.[149] Prohibiting the platform from engaging in vertical integration—that is, not allowing it to provide its own recommender algorithm—would remove incentives that lead to preferential treatment of middleware providers.

Jack Balkin also stresses the need to separate different *functions* housed in the same company.[150] In Facebook's case, for example, he contends brokering advertisements, serving advertisements, delivering content, and moderating content are all distinct roles that should be performed by different companies.[151] Lina Khan also argues for a revival of "common carriage's forgotten cousin: structural separations,"[152] a doctrine that places clear limits on a company's lines of business. Structural separations seek to eliminate the incentives that make unfair and discriminatory conduct appealing in the first place.[153] Separation could serve several functions, including eliminating conflicts of interest, preventing protected profits from financing entry into new markets, preserving system resiliency, promoting diversity, preventing excessive concentration of power, and prioritizing administrability.[154] Regardless of whether social media platforms actually engage in discriminatory or self-preferential behavior, the mere *existence* of strong incentives and capacities to discriminate poses a sufficient threat to warrant adopting a strict measure of separation.[155]

Even if separation of the underlying platform infrastructure from other layers results in lower efficiency or higher costs, such a compromise is warranted to avoid the dangers of concentration and asymmetrical power relations. While concentration in information industries through integration can offer immediate, noticeable consumer gratification, the *costs* of such efficiency and convenience are

149. Lina Khan, *The Separation of Platforms and Commerce*, 119 COLUM. L. REV. 973, 1001–03 (2019).

150. Balkin, *supra* note 43, at 86–87.

151. *Id.* at 91.

152. Khan, *supra* note 149, at 980.

153. *Id.*

154. *Id.* at 1052–64.

155. *Id.* at 1052.

not immediately discernible or determinate, and might even seem speculative.[156] For example, though the breakup of the AT&T monopoly led to a clear, immediate loss of efficiency, it later produced immense benefits for innovation, paving the way for new services like voicemail and the internet.[157] "An autocracy may make the trains run on time, and in the information world, a perfectly unified Bell system might be able to guarantee a good connection 99.999 percent of the time. But those satisfactions come at too high a price."[158]

Similarly, it is possible that disintegrating Facebook's recommender algorithm from the inventory layer and prohibiting Facebook from offering its own recommender algorithm or middleware might initially negatively affect user experience. The layering of third-party middleware on top of the social media platform's inventory layer might at first be clunky and unwieldy. This might lead some to argue that prohibiting Facebook from operating its seamless and well-integrated recommender system unjustifiably diminishes consumer welfare. However, as experience with railroads, banking, television networks, and telecommunications indicates, such decisive separation of business lines is necessary to avoid conflicts of interest and create optimal conditions for long-term innovation.[159]

Middleware also provides the site and opportunity for renegotiation of power relations on social media platforms. By removing conflicts of interest, structurally separated lines of business bolster the capacity for power redistribution. Since platforms would no longer control the curation and ranking process, their relative power vis-à-vis users, content creators, publishers, and businesses would be diminished. These groups could then renegotiate a new power distribution arrangement with platforms and middleware providers, neither of whom would have absolute, uncontested power akin to what social media platforms wield today.

156. WU, *supra* note 147, at 350–54.

157. *Id.* at 353–54.

158. *Id.* at 351.

159. Khan, *supra* note 149, at 1037–51.

V. Risk of Reconsolidation

One reservation with the proposal for middleware is that this approach of infusing competition by creating a new layer on top of a consolidated layer is futile since the new layer will also eventually become consolidated. Every new frontier of technology, one might argue, promises democratization, decentralization, and open access but subsequently fails to fulfill these promises. The internet, for example, was premised on ideals of decentralization, autonomy, choice, and equal and open access.[160] While the internet was initially a vibrant and decentralized space, eventually large parts ended up being controlled by just a few companies.[161] Similarly, the breakup of AT&T might seem futile because the market eventually reconsolidated.[162] By 2020, over eighty million Americans could access broadband through only a *single* provider, and two cable companies (Comcast-Xfinity and CharterSpectrum) controlled more than *half* of the broadband market.[163] Thus, there is a concern that the market for middleware, like its predecessors, will also eventually become consolidated.

Despite this historical experience of short-lived breakups and structural separations eventually resulting in reconsolidation, there is nevertheless value in pursuing structural separation and adding a new competitive layer, for two primary reasons. First, it pushes technology into the next frontier of innovation. Second, these historical

160. *See History of the Web*, WORLD WIDE WEB FOUNDATION, https://webfoundation.org/about/vision/history-of-the-web/ [https://perma.cc/LR7B-LYYL] (last visited May 5, 2024) (noting that the internet was designed on ideas of decentralization, non-discrimination, bottom-up design, universality, and consensus).

161. Katrina Brooker, *"I Was Devastated": The Man Who Created the World Wide Web Has Some Regrets*, VANITY FAIR (July 1, 2018), https://www.vanityfair.com/news/2018/07/the-man-who-created-the-world-wide-web-has-some-regrets [http://perma.cc/9MCP-4SXC].

162. Ernesto Falcon, *What the AT&T Breakup Teaches Us About a Big Tech Breakup*, ELECTRONIC FRONTIER FOUND. (Mar. 1, 2021), https://www.eff.org/deeplinks/2021/02/what-att-breakup-teaches-us-about-big-tech-breakup [http://perma.cc/SU4U-5BK7].

163. Christopher Mitchell & Katie Kienbaum, *Report: Most Americans Have No Real Choice in Internet Providers*, INST. FOR LOCAL SELF-RELIANCE (Aug. 12, 2020), https://ilsr.org/report-most-americans-have-no-real-choice-in-internet-providers/ [https://perma.cc/U9HQ-VH38 (staff-uploaded)].

experiences show that structural separation *alone* is insufficient, highlighting the need for it to be accompanied by regulation or other efforts to prevent reconsolidation.

A. Facilitating Innovation: Breakups & Structural Separation

For many years, AT&T used several tactics to prevent the entry of new firms and forestall innovations like modems and dial-up networks.[164] Such conduct was brought under the spotlight by virtue of the antitrust suit initiated by the Department of Justice ("DOJ").[165] The consequence was AT&T breaking up into seven regional monopolists, the Baby Bells.[166] Tim Wu explains the impact of AT&T's breakup on innovation thus:

> It became apparent, in retrospect, just how much innovation the Bell system monopoly had been holding back. For out of the carcass of AT&T emerged entirely new types of industries unimagined or unimaginable during the reign of AT&T. For example, the liberty to sell things to consumers that plugged into a (new) phone jack not only yielded the answering machine, but the home modulator/demodulator, or modem, allowing a home computer to speak with a network. That, in turn, made feasible an industry of "online service providers" like AOL or Compuserve, which themselves spawned internet service providers that were accessible from home, producing the Internet revolution.[167]

Though the AT&T case was directed at boosting competition in the market for long-distance phone calls specifically, it also spurred innovation and competition in all these unforeseen ways. Similarly, soon after AT&T's breakup, the Federal Communications Commission ("FCC") held a series of spectrum auctions that provided

164. Tim Wu, *Taking Innovation Seriously: Antitrust Enforcement If Innovation Mattered Most*, 78 ANTITRUST L.J. 313, 317 (2012).

165. *See* United States v. AT&T Co., 552 F. Supp. 131 (D.D.C. 1982).

166. *See id.* at *passim* (mandating the breakup).

167. TIM WU, THE CURSE OF BIGNESS: ANTITRUST IN THE NEW GILDED AGE 35 (2018).

the infrastructure for wireless services.[168] Absent the breakup, AT&T would have been the leading potential buyer of this spectrum, but due to the breakup, the Baby Bells competed with it in the bidding, thus infusing competition (albeit temporarily) in wireless connection.[169] Further, the widespread availability of AT&T's transistor patents and know-how contributed to the development of semiconductors.[170]

Admittedly, it is difficult to prove a causal relationship between the breakup of AT&T and subsequent innovations in telecom and technology sectors. However, a recent study shows that Bell's breakup significantly increased the rate of U.S. innovation in telecommunications on several metrics. For example, the number of patents in technologies in which Bell was active increased by nineteen percent per year relative to the number of patents in technologies that were similar but in which Bell was not active.[171] Importantly, the study shows an increase in diversity of innovation as well.[172] Hence, despite eventual reconsolidation in the telecom sector, even the temporary disruption caused by AT&T's breakup spurred significant innovation.

Even the immensely unpopular antitrust case against IBM (unpopular because of its long and tedious trial and abrupt end), paved the way for future innovation. Preventing IBM from tying its hardware with software products allowed an independent software industry to emerge.[173] The ongoing antitrust litigation acted as a "policeman at the elbow," cautioning IBM against engaging in other forms of anticompetitive conduct or vertical integration, which facilitated the

168. Randal C. Picker, *The Arc of Monopoly: A Case Study in Computing*, 87 UNI. CHI. L.R. 523, 530 (2020).

169. *Id.*

170. *Id.* at 533–34.

171. Martin Watzinger & Monika Schnitzer, *The Breakup of the Bell System and Its Impact on US Innovation*, COLLABORATIVE RSCH. CTR. TRANSREGIO: RATIONALITY & COMPETITION 2 (Oct. 10, 2022) (Ger.), https://rationality-and-competition.de/wp-content/uploads/2022/10/341.pdf [https://perma.cc/2QCJ-SKAJ].

172. *Id.*

173. Tim Wu, *Tech Dominance and the Policeman at the Elbow*, *in* AFTER THE DIGITAL TORNADO: NETWORKS, ALGORITHMS, HUMANITY (Kevin Werbach ed., 2020).

entry of other players into the PC market like Intel, Microsoft, and Apple.[174]

Likewise, the Microsoft antitrust enforcement created an opportunity for companies like Google, Amazon, and Facebook to emerge and shape the internet as it is today. Had Microsoft been allowed to continue its tying and bundling practices,[175] Google would never have survived, leaving consumers stuck with Bing on all their devices. Although the Microsoft antitrust enforcement failed to save Netscape (the *raison d'être* of the suit), it still set into motion the next generation of technology: browsers and applications. Though Microsoft continued to enjoy a dominant position in the OS market, the OS's interface faded into the background as the situs of all online activity migrated to the internet and web browsers.[176]

This type of innovation, which occurs at the next layer by small players or new entrants, is of the disruptive kind. Incumbents, however, have neither the incentive nor the ability to engage in disruptive innovation;[177] structural separation is therefore necessary to spur such innovation. Incumbents have an incentive to engage in only incremental innovation, not to sabotage their strongest products, and to maintain a stranglehold over the existing market.[178] For instance, the breakup of AT&T did not merely facilitate the replacement of traditional telecom by better telecom services; rather, it precipitated the next stage of technological development, with innovations like modems. Likewise, the Microsoft antitrust enforcement was important not because it gave users the choice of using Netscape's browser in addition to Internet Explorer; rather, it was important because it prompted the next stage of technology, transitioning the primary site for all activity from OSs to web browsers.

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174. WU, *supra* note 167, at 41.

175. ANDREW I. GAVIL & HARRY FIRST, THE MICROSOFT ANTITRUST CASES: COMPETITION POLICY FOR THE TWENTY-FIRST CENTURY 51–87 (2014).

176. Picker, *supra* note 168, at 550.

177. CLAYTON M. CHRISTENSEN, THE INNOVATOR'S DILEMMA: WHEN NEW TECHNOLOGIES CAUSE GREAT FIRMS TO FAIL 166–67 (1997).

178. *Id.*

Today, innovation in social media has plateaued.[179] Meta's failed attempts in preempting and creating the next generation of social media (recall, Metaverse!) showcase the inability of incumbents to engage in disruptive innovation.[180] Structural separation, breakups, and uniform and universal access redress this not just by providing more choice of *existing* technology, but also by creating opportunities for new players to introduce the *next generation* of technology. Though some historical instances of structural separations and breakups (like AT&T, Microsoft, and IBM) did not manage to stay competitive for very long and eventually ended up in reconsolidation, they still fostered competition long enough to spur innovation, prompting the next stage of technology and creating entirely new markets. Hence, the hope from middleware is not just that it will provide users with more choice of recommender algorithms but also that it would precipitate the next stage of technological innovation—one that cannot even be contemplated at present.

All this leads to a never-ending cycle: Forced breakups or structural separations intended to address consolidation lead only to short periods of disruptive innovation followed, inevitably, by reconsolidation. Breaking out of the reconsolidation cycle requires more than just structural separation and is part of a wider anti-monopoly approach, as described below.

B. Structural Separation: Only the First Step

Preventing the reconsolidation of a market that has been subjected to structural remedies (like AT&T), or of the next layer or a newly created market (like Microsoft's antitrust case), is part of a larger

179. Chris Stokel-Walker, *Social-Media Innovation Is Dead*, BUS. INSIDER (Nov. 19, 2020), https://www.businessinsider.com/twitter-fleets-social-media-innovation-dead-instagram-facebook-snapchat-2020-11 [https://perma.cc/2U26-HTLE]; Enrique Dans, *Whatever Happened To Innovation On Social Networks?*, FORBES (Nov. 24, 2020), https://www.forbes.com/sites/enriquedans/2020/11/24/whatever-happened-to-innovation-on-social-networks/ [https://perma.cc/MGM8-6QZK].

180. Ryan Mac, Sheera Frenkel & Kevin Roose, *Skepticism, Confusion, Frustration: Inside Mark Zuckerberg's Metaverse Struggles*, N.Y. TIMES (Oct. 10, 2022), https://www.nytimes.com/2022/10/09/technology/meta-zuckerberg-metaverse.html [https://perma.cc/9NYR-C66U (staff-uploaded, dark archive)].

anti-monopoly strategy.[181] Structural separation is just the first step of such an anti-monopoly strategy. This wider anti-monopoly approach should be tailored to specific sectors, since the reasons for consolidation in each market are distinct.[182] For instance, even though the Microsoft case paved the way for the emergence of new companies like Google, Amazon, and Facebook, these companies went on to become monopolies in their respective markets. This eventual consolidation in the new markets could be the result of weakened merger and antitrust enforcement[183] or other legal and institutional factors.[184] Thus, developing a strategy to prevent reconsolidation is a highly contextual exercise.

In the context of social media, middleware will help stimulate innovation. Subsequently, to prevent consolidation of this new layer, a broader anti-monopoly strategy would have to be developed.[185] It is also possible that the market for middleware naturally tends towards some degree of consolidation, for instance, due to choice fatigue amongst consumers.[186] An interesting analogy is the European Commission's Microsoft case. Unlike the U.S. antitrust settlement discussed above, the European Commission remedy required computer users in the EU to be given a browser ballot—that is, a choice screen where the user chooses a browser from among fourteen

181. Lina Khan, *The New Brandeis Movement: America's Antimonopoly Debate*, 9 J. EUR. COMPETITION L. & PRAC. 131, 132 (2018).

182. *See generally* MORGAN RICKS, GANESH SITARAMAN, SHELLEY WELTON & LEV MENAND, NETWORKS, PLATFORMS, AND UTILITIES: LAW AND POLICY (2022).

183. Press Release, F.T.C., FTC Staff Presents Report on Nearly a Decade of Unreported Acquisitions by the Biggest Technology Companies (Sept. 15, 2021), https://www.ftc.gov/news-events/news/press-releases/2021/09/ftc-staff-presents-report-nearly-decade-unreported-acquisitions-biggest-technology-companies [https://perma.cc/GK8L-57QL].

184. *See* JULIE E. COHEN, BETWEEN TRUTH AND POWER: THE LEGAL CONSTRUCTIONS OF INFORMATIONAL CAPITALISM 100 (2019); Amy Kapczynski, *The Law of Informational Capitalism*, 129 YALE L.J. 1276, 1289 (2020).

185. Khan, *supra* note 181.

186. Dirk Bollen et al., *Understanding Choice Overload in Recommender Systems*, *in* PROCEEDINGS OF THE FOURTH ACM CONFERENCE ON RECOMMENDER SYSTEMS 63, 68 (2010); Alexander Chernev, Ulf Böckenholt & Joseph Goodman, *Choice Overload: A Conceptual Review and Meta-Analysis*, 25 J. CONSUMER PSYCH. 333, 334 (2015).

options.[187] However, giving EU users a choice did not produce a materially different outcome from what was observed in the U.S., where a choice screen was not available. Though Microsoft is no longer the dominant player in browsers, that is true in many countries—even ones where browser ballots and choice screens were not introduced. This further strengthens the position that user choice is simply a performative form of regulation that is often rendered redundant for cognitive reasons.[188] Further, some have argued that choice is not truly a manifestation of a user's autonomy or preferences but can be shaped and manipulated in many ways.[189]

Although many players in a perfectly competitive market seems unlikely, it is necessary to assess what degree of consolidation in the middleware market is to be expected, or even desirable. The entire arsenal of anti-monopoly regulatory tools could be deployed to prevent consolidation beyond this desired level or even regulate it. For example, strong merger enforcement could prevent anticompetitive horizontal or vertical mergers. Alternatively, regulations could be deployed to secure baseline protections and guarantees from middleware providers. For instance, it is possible that competition among middleware providers would incentivize them to engage in even more data extraction and behavioral manipulation to make algorithms more engaging or addictive to users. Without some minimum data protection regulation, competition in the market for middleware could devolve into a race to the bottom.[190]

Similarly, to allow various disempowered groups (consumers, publishers, and businesses) to leverage opportunities offered by

187. European Commission Press Release IP/09/1941, Antitrust: Commission Accepts Microsoft Commitments to Give Users Browser Choice (Dec. 16, 2009), https://ec.europa.eu/commission/presscorner/detail/en/IP_09_1941 [https://perma.cc/RT7D-7VU5].

188. Lomas, *Europe's Android "Choice" Screen*, *supra* note 100; Lomas, *Google's EU Android Choice Screen Isn't Working*, *supra* note 100.

189. Richard H. Thaler, Cass R. Sunstein & John P. Balz, *Choice Architecture*, *in* THE BEHAVIORAL FOUNDATIONS OF PUBLIC POLICY 428, 429 (2013); Dan Simon & Stephen A. Spiller, *The Elasticity of Preferences*, 27 PSYCH. SCI. 1588, 1588 (2016); Eric J. Johnson et al., *Beyond Nudges: Tools of a Choice Architecture*, 23 MARK LETT 487, 488 (2012).

190. *See infra* Part VI.

middleware and effectively renegotiate power relations, an additional regulatory framework empowering these disadvantaged groups is needed. For example, the AT&T breakup had a devastating effect on the telecommunication industry's union density, resulting in "fissuring."[191] In contrast, in certain industries like mining, transportation, shipping, and textile production, breakups might empower labor by increasing union bargaining power vis-à-vis employers.[192]

For social media and middleware, one could similarly analyze the effect of structural separation on the various affected groups (like creators, businesses, and consumers) and their ability to leverage this opportunity. For example, provisions for collective bargaining could be made for creators and news publishers to help them effectively negotiate new relationships with middleware providers.

Thus, structural separation is only the first step in this anti-monopoly approach for creating the conditions that enable various groups to renegotiate power relations. Structural separation will have to be supplemented with other measures, such as bargaining codes for news publishers[193] and data protection laws for consumers.[194] That these measures are needed does not diminish the necessity of middleware adoption. Importantly, middleware does *not* preclude these additional regulatory measures from being implemented as well.

VI. Privacy Implications

The practices of social media platforms already raise several concerns about excessive data collection, lack of informed consent, and exploitative data use and sharing.[195] Admittedly, sharing user data

191. Hiba Hafiz, *Rethinking Breakups*, 71 DUKE L.J. 1491, 1525–49 (2022).

192. *Id.* at 1567.

193. *See generally* Treasury Laws Amendment (News Media and Digital Platforms Mandatory Bargaining Code) Bill 2021 (Cth) No. 21 (Austl.); Online News Act, Bill C-18, 44th Parl., S.C. 2023, c 23 (Can.).

194. *See generally* Regulation 2016/679 of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation), 2022 O.J. (L 119) 1 [hereinafter General Data Protection Regulation].

195. Zuboff, *supra* note 1.

with both the platform and an entire marketplace of middleware providers will exacerbate these concerns.[196] For middleware to work, a user's data must be shared not just with their own middleware provider but also with their friends' middleware providers so that the user's content can feature on their friends' feeds. This will extend data access to many more third parties, raising several privacy concerns. Take as an example the predicament of a privacy-conscious user: Even if they choose a middleware provider with superior data protection practices, their choice might be rendered ineffectual if their connections adopt middleware with inferior privacy practices.

Because most proposals around interoperability and open APIs are premised on sharing user data widely, they all encounter stumbling blocks of privacy.[197] For example, it has been argued that each new set of Facebook's open APIs has made user data more public and vulnerable.[198] A social media platform sharing user data with third-party services evokes unpleasant memories of the Cambridge Analytica scandal, where the connecting of Facebook users' private data to voter records generated massive public backlash.[199] Indeed, it has been alleged that after Cambridge Analytica, Facebook started using privacy as a pretext for cutting off API access to third parties that posed a competitive threat.[200]

Though middleware's privacy implications seem dire on their face, they need not be so, as there are two possible trajectories for middleware. In one scenario, more competition and greater choice will improve privacy conditions by forcing rivals to compete on privacy metrics. Alternatively, if consumers do not value privacy enough, then it will result in a race to the bottom: Middleware providers will engage in increasingly extractive and exploitative data practices to improve their algorithms and attract users. To steer middleware towards the

196. Keller, *supra* note 15, at 171–72.

197. Bodle, *supra* note 142, at 321–22.

198. Bodle, *supra* note 142, at 328–29.

199. Carole Cadwalladr & Emma Graham-Harrison, *Revealed: 50 Million Facebook Profiles Harvested for Cambridge Analytica in Major Data Breach*, GUARDIAN (Mar. 17, 2018, 6:03 EDT), https://www.theguardian.com/news/2018/mar/17/cambridge-analytica-facebook-influence-us-election [https://perma.cc/23Q2-BVEM].

200. MAJORITY STAFF REP., *supra* note 71, at 168–69.

more optimistic trajectory—one where a competitive market for middleware improves privacy conditions—it is necessary to pass federal privacy legislation and design technical models that facilitate data sharing and data pooling. In addition to being necessary to introduce middleware, these are also necessitated by extensive and unavoidable digital activities, which entail vast data collection and sharing.

A. Middleware's Potential Trajectories: The Complicated Relationship Between Competition & Privacy

One view of privacy is that more competition will increase consumer choices and the overall quality of products.[201] If consumers value privacy, then more competition would compel market players to provide superior privacy protections.[202] For example, in the early days of social media, all startups competed fiercely on quality; Facebook too distinguished itself from its primary competitor, MySpace, by projecting itself as the privacy-centered alternative.[203] In contrast, privacy standards worsened after Facebook's acquisition of WhatsApp reduced competition in the market for instant messaging apps.[204] This view argues that competition is directly related to privacy; an increase in competition improves privacy. While lessening competition certainly seems to have worsened privacy conditions in many markets like social media, the relationship between competition and privacy is far from uncontroversial. In many markets, even when privacy-preserving alternatives are present, like DuckDuckGo for search engines and Signal for instant messaging, these alternatives have failed to attract consumers.[205]

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201. *See generally* Erika M. Douglas, *The New Antitrust/Data Privacy Law Interface*, 130 YALE L.J.F. 647 (2020); Maureen K. Ohlhausen & Alexander P. Okuliar, *Competition, Consumer Protection, and the Right [Approach] to Privacy*, 80 ANTITRUST L.J. 121 (2015).

202. *See generally* Douglas, *supra* note 201.

203. Srinivasan, *supra* note 87, at 46–54.

204. Srinivasan, *supra* note 87, at 69–81.

205. *See generally* Matthew Capala, *Global Search Engine Market Share in the Top 15 GDP Nations*, ALPHAMETIC (Jan. 10, 2025), https://alphametic.com/global-search-engine-market-share [https://perma.cc/38DN-JY5U] (noting that the market share of DuckDuckGo in the U.S. was only 2.04% in 2024); David

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A straightforward analysis might suggest that creating a competitive middleware market would compel providers to compete on privacy metrics (a parameter of higher quality) and offer consumers better, more-tailored data protection.[206] After all, in privacy too, there are fundamental disagreements about what privacy entails, its relative importance to different people, and how it should be weighed against other interests and values.[207] Under this more optimistic view, privacy-conscious users would now have more options and could opt for middleware that promises more privacy protections. Those who find targeted advertising intrusive, for example, could use ad-free middleware. Thus, a competitive middleware market might improve privacy outcomes by offering consumers more privacy-preserving choices—the availability of which would pressure *all* players to improve their baseline privacy protections, thus improving overall privacy standards.

Moreover, middleware could create an opportunity for competitive solutions that break away from the surveillance-based models of incumbent social media platforms, enabling alternative ecosystems based on greater user empowerment and democratization.[208] Indeed, Big Tech companies have proven such poor stewards of user data that entrusting *them* with user data (at the exclusion of middleware providers or other data intermediaries) produces no obvious benefits.[209] On the contrary, "[m]aking it easier for new entrants to create privacy-preserving alternatives will pressure incumbents to do better, and allow users to migrate away when they don't. New interoperability rules will create new data flows, and

Curry, *Messaging App Revenue and Usage Statistics*, BUS. OF APPS (Jan. 22, 2025), https://www.businessofapps.com/data/messaging-app-market/ [https://perma.cc/9L82-79ZV] (noting that Signal's market share in the U.S. is a meager 0.51%).

206. Fukuyama, *supra* note 5, at 32–35.

207. DANIEL J. SOLOVE & PAUL M. SCHWARTZ, INFORMATION PRIVACY LAW 41–87 (7th ed. 2021).

208. Lian Parsons, *Harvard Professor Says Surveillance Capitalism Is Undermining Democracy*, HARVARD GAZETTE (Mar. 4, 2019), https://news.harvard.edu/gazette/story/2019/03/harvard-professor-says-surveillance-capitalism-is-undermining-democracy/ [https://perma.cc/BVA3-A49S].

209. Bennett Cyphers & Cory Doctorow, *Privacy Without Monopoly: Data Protection and Interoperability*, ELEC. FRONTIER FOUND. (Feb. 12, 2021), https://www.eff.org/wp/interoperability-and-privacy [https://perma.cc/7QYZ-JZ68].

remove some of the platforms' discretion to decide how data is shared."[210]

However, this trajectory (where increased competition improves privacy outcomes) is by no means the predestined outcome of a competitive market for middleware. Fierce competition among middleware providers could instead lead to increased data collection and surveillance—a race to the bottom in a bid to improve recommender algorithms. If consumers do not value privacy as a norm and instead care only about improved social media experiences, middleware providers might use even more extractive data collection and surveillance strategies (say by combining social media data with data from other sources) to improve their recommender systems. Predicting which of these two trajectories would transpire—the optimistic "more competition, more privacy" or the pessimistic "more competition, worse privacy"—would be an exercise in speculation. Instead, a better way to understand middleware's privacy implications might be through the use of Helen Nissenbaum's idea of "privacy as contextual integrity."[211]

B. Analyzing Middleware's Privacy Effects Through the Lens of Contextual Integrity

Nissenbaum's now-famous idea of using contextual integrity as a benchmark for privacy has a core stipulation: When determining what amounts to a violation of privacy, one needs to look at the privacy norms of specific contexts.[212] The extent and nature of data collection, processing and sharing should be appropriate to that specific context and obey its governing norms of distribution.[213] For example, the informational norms (expectations surrounding data collection and distribution) regarding public records versus those for surveillance might differ widely.[214] When viewed through the lens of contextual privacy, the sharing of data with third-party services such as Block Party (or other middleware providers) is not facially privacy-

210. *Id.*

211. Helen Nissenbaum, *Privacy as Contextual Integrity*, 79 WASH. L. REV. 119, 119 (2004).

212. *Id.* at 128.

213. *Id.* at 128–29.

214. *Id.* at 120–24.

invasive.[215] Under the framework of contextual integrity, merely sharing data with more parties does not automatically raise privacy concerns.[216] Instead, it is necessary to investigate whether these third parties respect the informational norms of the social media *context*; if they do, then the user's privacy expectations have been protected.[217]

Admittedly, inferring the informational norms of social media is difficult; the technology is fairly new and still evolving with fluctuating norms. However, some informational norms for digital interactions, including those for social media, can be derived from consulting analogous offline social activities and structures or by analyzing the underlying purpose of a particular technology and then working backwards to abstract relevant informational norms.[218] Yet another recommendation has been a crowdsourcing method: using surveys to help discover the informational norms applicable to any context.[219]

Some informational norms for social media can be inferred through user experiences with these platforms. For example, users expect these platforms to use data to share posts with friends, recommend relevant content, and display targeted advertising.[220] So long as third-party services—such as middleware providers—also comply with these same informational norms, privacy should not be considered violated.[221]

In fact, user data on social media is already widely shared with third parties—hundreds of thousands of them.[222] While adding a

215. Rajendra-Nicolucci & Zuckerman, *supra* note 12.

216. *Id.*

217. *Id.*

218. Helen Nissenbaum, *A Contextual Approach to Privacy Online*, 140 DAEDALUS 32, 37–38 (2011).

219. Yan Shvartzshnaider et al., *Learning Privacy Expectations by Crowdsourcing Contextual Informational Norms*, PROCEEDINGS, THE AAAI CONFERENCE ON HUMAN COMPUTATION AND CROWDSOURCING 209, 211 (Arpita Ghosh & Matthew Lease eds., 2016).

220. Rajendra-Nicolucci & Zuckerman, *supra* note 12.

221. *Id.*

222. Don Marti, Fengyang Lin, Matthew Schwartz & Ginny Fahs, *Who Shares Your Information with Facebook? Sampling the Surveillance Economy in 2023*, CONSUMER RPTS. (Jan. 2024), https://advocacy.consumerreports.org/wp-

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middleware layer would increase data sharing even further, it is already inevitable that the number of entities with which user data is shared will increase. What matters is not whether data is being shared with *more* third parties, but whether these parties handle the data *responsibly* by complying with the same contextual informational norms applicable to social media platforms.

C. The Need for a Data Protection Law

Social media already has serious privacy problems; far from worsening these problems, middleware merely exposes the urgent need to address them. Several steps should be taken to improve the privacy conditions of social media platforms to ensure these problems are not imitated or exacerbated by middleware. The most obvious and oft-repeated solution is the urgent need to introduce a comprehensive federal data protection law[223] and a data protection authority to enforce it.[224] Indeed, a law like the General Data Protection Regulation[225] ("GDPR") would directly cover middleware entities (either as "controllers" or "processors") as users would directly interact with middleware providers—presumably even contracting with them when selecting middleware.[226] Similarly, the scope of "covered entity" under the draft American Data Privacy and Protection Act[227] would extend to middleware providers since they process data.[228] Hence, *any* privacy law would also apply to middleware providers due to their role

content/uploads/2024/01/CR_Who-Shares-Your-Information-With-Facebook_01_17_23_vf.pdf [https://perma.cc/PXD5-NZJE].

223. Press Release, U.S. Sen. Comm. on Com., Sci. & Transp., What They Are Saying: American Data Privacy and Protection Act (June 15, 2022), https://www.commerce.senate.gov/2022/6/what-they-are-saying-american-data-privacy-and-protection-act [https://perma.cc/8C27-CK3Z]; Stacey Gray, *Long Overdue: Comprehensive Federal Privacy Law*, FUTURE OF PRIV. F. (Nov. 15, 2018), https://fpf.org/blog/fpf-comments-on-a-national-baseline-consumer-privacy-law/ [https://perma.cc/FQE7-9CNB].

224. *The U.S. Urgently Needs a Data Protection Agency*, ELEC. PRIV. INFO. CTR., https://epic.org/campaigns/dpa/ [https://perma.cc/WWB7-JQP7].

225. General Data Protection Regulation, *supra* note 194.

226. *Id.* art. 4(7)–(8) (defining "controller" and "processor").

227. H.R. 8152, 117th Cong. (2022).

228. *American Data Privacy and Protection Act Draft Legislation: Section by Section Summary*, https://www.commerce.senate.gov/services/files/9BA7EF5C-7554-4DF2-AD05-AD940E2B3E50 [https://perma.cc/N2PV-NVSB].

in handling and processing user data; the usual stipulations regarding notice, consent, duties, rights, and liabilities would also bind them.

Data sharing is inevitable in the modern digital economy. Countries like the U.K. have gone a step further and devised a code of practice for data sharing, recognizing data as an asset and the role of data access and sharing in producing greater economic and social benefits.[229] To be sure, overcoming lawmaking inertia and partisan politics to get any tech legislation passed has proven difficult. Despite its practical difficulty, there is no substitute for passing privacy legislation; the use of existing regulations and consumer protection laws is only a weak stopgap arrangement.[230] Beyond being needed for middleware-related problems, privacy legislation is also necessary for the ever-expanding digital space.

As an additional layer of safety against middleware privacy harms, a system of licensing or privacy auditing could be used to verify that middleware providers are complying with pre-specified minimum standards of data collection and processing.[231] This auditing could be carried out by an industrial body, governmental agency, or independent body to ensure compliance does not become so costly as to dissuade entry.

Authorities around the world have noted the importance of data sharing in facilitating innovation and competition. In fact, the rate of public or private innovation has been tied to cooperatively pooling data.[232] Yet others have noted the value of the data commons in producing great public benefits, furthering knowledge and constituting the backbone of policy research.[233] Models such as data trusts and data commons are being examined to facilitate the sharing of data for research or for enabling competition and innovation while

229. *Data Sharing: A Code of Practice*, INFO. COMM'R'S OFF. (2024) (U.K.), https://ico.org.uk/media2/ictfahk2/data-sharing-a-code-of-practice-all-1-0-2.pdf [https://perma.cc/G3RW-867E].

230. *The U.S. Urgently Needs a Data Protection Agency*, *supra* note 224.

231. Fiona Scott Morton, *supra* note 48, at 1033–34.

232. Michael Mattioli, *The Data-Pooling Problem*, 32 BERKELEY TECH. L.J. 179, 179 (2017).

233. Jane Yakowitz, *Tragedy of the Data Commons*, 25 HARV. J.L. & TECH. 1, 2 (2011).

also preserving privacy.[234] Industry-led alternatives in the form of the Data Transfer Project (a collaboration of Apple, Google, Facebook, Microsoft, and X)[235] or the Data Transfer Initiative (a nonprofit organization comprising Apple, Meta, and Google)[236] are also attempting to design data transfer tools, opensource libraries, and appropriate technical tools like APIs that would allow individuals to easily move their data between various service providers. Many technical models and privacy-preserving techniques that would facilitate data sharing without compromising privacy have also been discussed in other sectors, like healthcare.[237]

In the U.K., government authorities have noted the potential tension between privacy and various benefits (to competition and innovation) of data sharing while expressing optimism that these goals could be reconciled.[238] The EU's Data Act has similar objectives to stimulate a competitive data market, open opportunities for data-

234. Janis Wong, Tristan Henderson & Kirstie Ball, *Data Protection for the Common Good: Developing a Framework for a Data Protection-Focused Data Commons*, 4 DATA & POLICY e3-1, e3-3 (2022); Stuart Mills, *Who Owns the Future? Data Trusts, Data Commons, and the Future of Data Ownership* 13 (2019), https://www.ssrn.com/abstract=3437936 [https://perma.cc/8L6M-KJ45]; Kieron O'Hara, *Data Trusts: Ethics, Architecture and Governance for Trustworthy Data Stewardship* 21 (Web Sci. Inst. White Paper No. 1, 2019), https://eprints.soton.ac.uk/428276/1/WSI_White_Paper_1.pdf [https://perma.cc/BAV8-LAVM].

235. William Morland, *Data Transfer Project: Enabling Portability of Photos and Videos Between Services*, ENG'G AT META (Dec. 2, 2019), https://engineering.fb.com/2019/12/02/security/data-transfer-project/ [https://perma.cc/PU4U-R7DM]; Markham Erickson & Ali Lange, *Building Data Portability to Help Consumers Choose*, GOOGLE (Mar. 9, 2022), https://blog.google/outreach-initiatives/public-policy/building-data-portability-help-consumers-choose/ [https://perma.cc/68G8-ZPH5].

236. Zander Arnao & Derakhshani Delara, *The Future of Data Portability Is Direct Data Transfers*, TECH POL'Y PRESS (Aug. 24, 2023), https://techpolicy.press/the-future-of-data-portability-is-direct-data-transfers [https://perma.cc/EQU7-YWYW]; About Page, DATA TRANSFER INITIATIVE, https://dtinit.org/about [https://perma.cc/HB6G-TBTW] (last visited May 4, 2024).

237. Hao Jin, Yan Luo, Peilong Li & Jomol Mathew, *A Review of Secure and Privacy-Preserving Medical Data Sharing*, 7 IEEE ACCESS 61656, 61656 (2019).

238. INFO. COMM'R'S OFF., COMPETITION AND DATA PROTECTION IN DIGITAL MARKETS: A JOINT STATEMENT BETWEEN THE CMA AND THE ICO 27 (2021) (U.K.), https://ico.org.uk/media/about-the-ico/documents/2619797/cma-ico-public-statement-20210518.pdf [https://perma.cc/8UT3-RB9R].

driven innovation, and make data more accessible for all.[239] The National Science and Technology Council in the U.S. has also released a national strategy to advance the research, development, and adoption of privacy-preserving data sharing and analytics technologies.[240] It notes that a few technical approaches and privacy-preserving technologies have already been developed, including trusted execution environments, secure multiparty computation, and homomorphic encryption.[241] Industry-led initiatives (like the Data Transfer Project and the Data Transfer Initiative) have also put forth a host of measures, such as encrypted data storage using an ephemeral key and encryption in transit, in addition to principles like data minimization.[242]

Though these proposed models must be assessed for their suitability to support privacy efforts in middleware, these examples show work is already underway to ensure data sharing and data pooling can be done in a manner that unlocks data's value without compromising privacy. Thus, remedying privacy concerns with middleware will require a multi-frontal attack. Privacy-preserving technical solutions for data sharing and data pooling combined with privacy regulation will help middleware be implemented while also preserving privacy. All the individual components of this multi-frontal approach (privacy legislation and technical interventions) are ultimately unavoidable. There is a wide demand for these regulatory and technical interventions for a range of proposals beyond middleware that are premised on data sharing and interoperability.

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239. *Data Act*, *supra* note 136.

240. NATIONAL STRATEGY TO ADVANCE PRIVACY-PRESERVING DATA SHARING AND ANALYTICS, NAT'L SCI. & TECH. COUNCIL (2023), https://bidenwhitehouse.archives.gov/wp-content/uploads/2023/03/National-Strategy-to-Advance-Privacy-Preserving-Data-Sharing-and-Analytics.pdf [https://perma.cc/S9M7-MNMV].

241. *Id. But see* Theresa Stadler & Carmela Troncoso, *Why the Search for a Privacy-Preserving Data Sharing Mechanism Is Failing*, 2 NATURE COMPUTATIONAL SCI. 208 *passim* (2022).

242. *Data Transfer Project: Overview and Fundamentals*, DATA TRANSFER INITIATIVE 14–17 (July 20, 2018), https://dtinit.org/assets/dtp-overview.pdf [https://perma.cc/4VWB-YB26].

VII. Conclusion

Social media has two major problems: the homogenous nature of proprietary recommender algorithms and the power asymmetries between platforms and affected groups (users, content creators, publishers, and businesses). By creating a marketplace of ranking and curation algorithms, middleware would solve both problems. For the former problem, introducing a new layer of recommender algorithms on top of existing social media inventory would create competition and space for innovation. For the latter problem, such a market disruption would provide an opportunity for disempowered groups to renegotiate their power relations with social media platforms and middleware providers. By separating inventory from filtering, curation, and ranking functions, middleware would disintegrate the monopoly power of social media platforms. In other words, middleware could be the much-needed force of disruptive change in the social media ecosystem—but only if it is accompanied by appropriate regulation.

Accordingly, this Article makes two recommendations: (1) imposing mandatory and uniform API access, either as an antitrust remedy or through legislation; and (2) limiting social media platforms' participation in the middleware market through structural separation. As for the concern that the middleware layer could also eventually reconsolidate, even temporary disruptions caused by middleware can drive innovation and technological progress, as shown by past experiences with AT&T and Microsoft. Structural separation, however, is only the first step in a broader anti-monopoly strategy.

Moreover, because data sharing in today's digital age is inevitable, it is imperative to enact strong privacy legislation and develop technical models designed to facilitate data sharing in a privacy-preserving manner. With these regulatory and institutional safeguards in place, middleware promises to act as a broad-range structural solution to several problems that plague social media, stirring this otherwise stagnant and putrefied ecosystem.